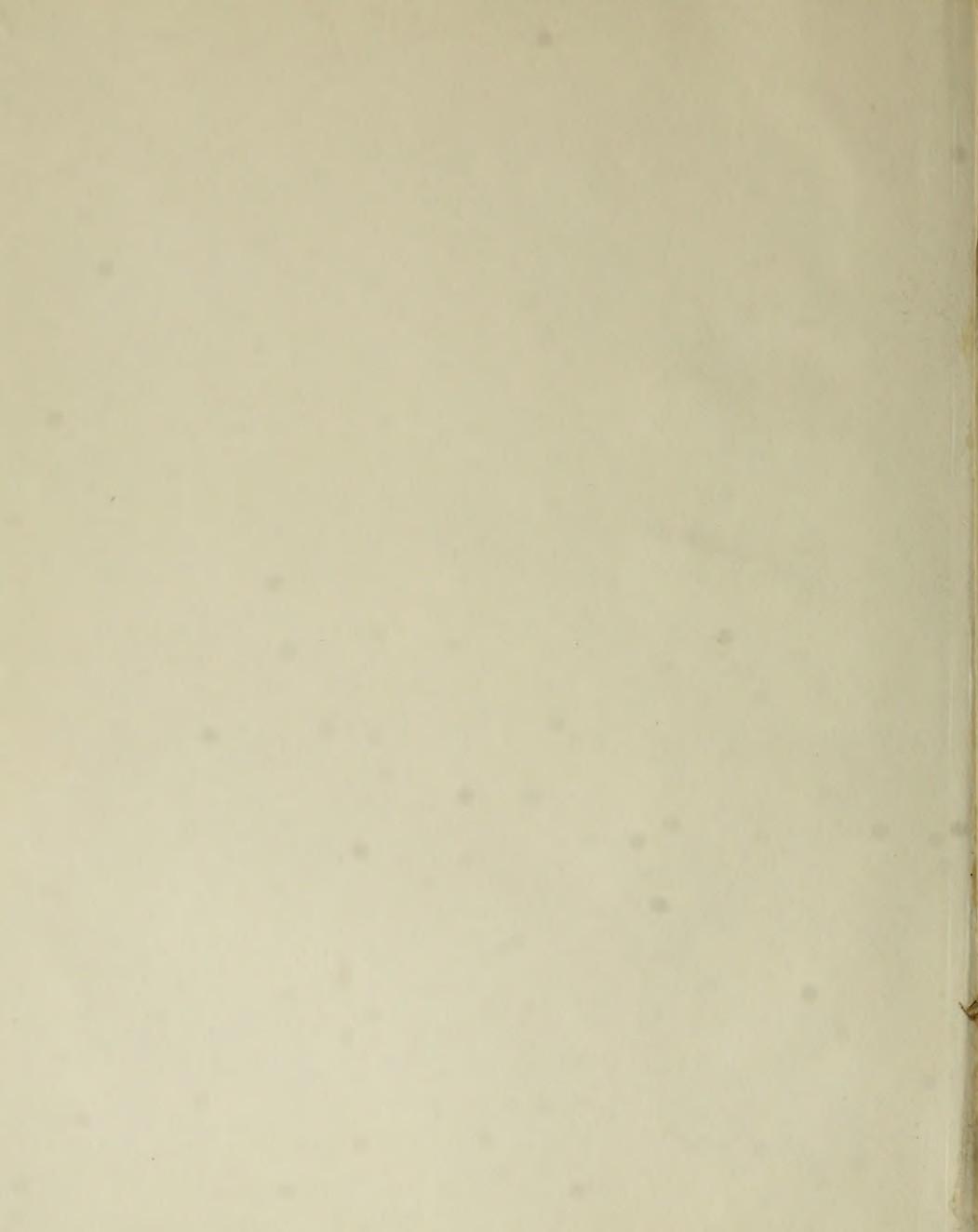


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LORD AND BURNHAM CO.

CATALOGUE OF
GREENHOUSE HEATING
& VENTILATING
APPARATUS.

© МАНИКУДАИАДЮ

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L.C.

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BY LORD & BURNHAM CO.

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LORD & BURNHAM CO.

Established 1856.

HORTICULTURAL ARCHITECTS AND BUILDERS,
STEAM AND HOT WATER HEATING ENGINEERS

MANUFACTURERS OF

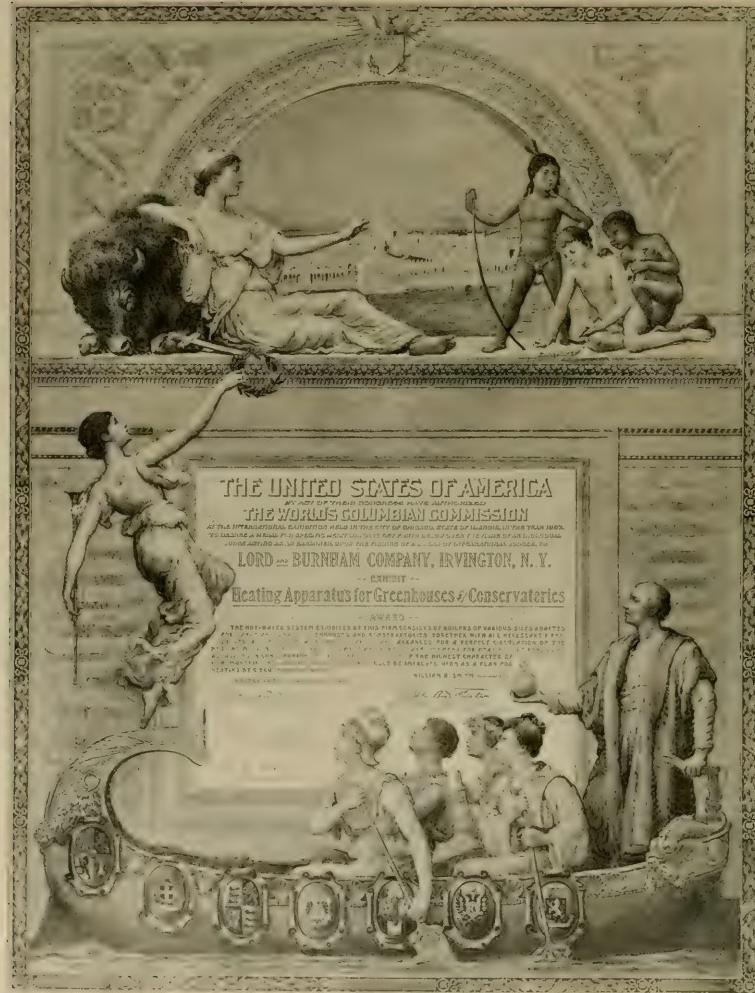
HOT WATER HEATERS,
STANDARD HEATING PIPES AND FITTINGS,
AND PATENT APPARATUS FOR
GREENHOUSE HEATING AND VENTILATION.

NEW YORK OFFICE: 160 FIFTH AVENUE.

GENERAL OFFICE AND WORKS: IRVINGTON-ON-HUDSON, N. Y.



B. 1871 5B41C
1875 1876
1877 1878
1879 1880





THE LORD & BURNHAM CO.

*Received, at the World's Fair, Chicago, besides
the Award for Heating Apparatus here represent-
ed, five other Highest Awards for Conservatories,
Rosehouses, Greenhouses, Iron Framed Plant
Tables and Beds and Ventilating Machinery.*

INTRODUCTORY.

In placing this catalogue in the hands of our patrons, we beg to call their attention to our line of Hot Water Heaters, which we believe to be the most complete ever put upon the market, and the nearest to meeting every want. In their construction we have retained everything which the past has shown to be good, and have adopted many new features which experience and experiment have proved valuable.

We also mention our pipes and fittings which are standard for greenhouse heating, and of the highest quality and finish; while a pipe header and automatic air valve, recently introduced and patented by us, is a decided improvement,—economizing space and labor.

An important adjunct of a greenhouse is an effective system of ventilation. The ventilating apparatus shown in this catalogue will be found adapted to every requirement, easy in operation, neat in design, strong and durable.

Besides calling attention to the improvements which we have recently made, we desire to express in a special manner to our friends our thanks for their patronage and for the many commendations which have been so generously bestowed upon our manufactures.

Respectfully,

LORD & BURNHAM CO.

GREENHOUSE HEATING.

The heating of greenhouses to the best advantage, under the varying conditions of climate and interior requirements, demands the services of an experienced specialist in horticultural work. The success of the Florist, Gardener or Amateur depends largely upon the satisfactory working of the heating apparatus, for without proper conditions of temperature, however skillful the plantsman may be, failure is certain.

The Principle of hot water circulation is very simple. The power which produces the circulation of water through the apparatus is gravity, or the difference in weight of the ascending and descending columns of water in the perpendicular flow and return pipes. Water is at its greatest density at 39° Fahrenheit. As the temperature is raised above this point the volume of water increases and the density decreases, or, in other words, the water becomes lighter. Thus when the apparatus is filled with water and the fire started, the heat coming in contact with the surfaces of the heater is absorbed by the water which, becoming lighter, is forced upward through the heater outlet and flow pipe to the radiating coils, by the colder heavier water descending through the return pipe. As the water passes through the radiating pipes, it imparts its heat to the atmosphere until, upon again reaching the heater it has become cooler and heavier and again takes the place of the heated water, thus forming a continuous circulation as long as there is fire in the heater, or a difference in the temperature of the water in the flow and return pipes.

The Principle Applied will accommodate itself more fully than any other to the various conditions found in general greenhouse heating. By this method houses up to 300 feet in length are warmed by a heater placed at one end with little or no variation in temperature between the two ends; or, a range of several houses may be warmed by the same heater with such variations in temperature in the separate houses and compartments as may be required to suit the class of plants in each, the temperature of each being under independent and complete control.

Its Adaptability. It is obvious that this system is the one best adapted to the heat requirements of perfect plant growth. A large amount of radiating surface, moderately heated, imparts to the air a mild congenial warmth, free from any impurities and neither drying nor impairing its vitality in the least, thus producing the nearest possible approach to the natural atmosphere.

In Its Management, it requires less attention than any other method. When once the pipe coils are properly proportioned to maintain certain temperatures in the different houses or compartments the entire apparatus is controlled by the draught regulator on the heater. By simply increasing or decreasing the fire by means of its draught regulator,—and a person will quickly be-

come familiar with the amount of draught necessary to obtain the desired results,—the temperature may be regulated to suit all conditions of weather. It is then *automatic in its operation*, since: should the outside temperature fall or the wind rise, a fall of temperature in the greenhouse would immediately follow; but the increased wind velocity or lower outside temperature increases the chimney draught, which in turn quickens the circulation and raises the temperature of the water, and additional heat is radiated from the coils and no change in the temperature of the greenhouse takes place. Then again, should the outside temperature rise, or the wind die out, a rise in the greenhouse temperature would follow, which is not desired: the chimney draught is now decreased enough to reduce the circulation and temperature of the water, less heat is radiated from the coils and the temperature of the greenhouse is not changed. The fire in the heater after being prepared for the night and properly regulated, will run automatically without attention until morning, or from eight to ten hours. In the morning the fire is shaken down, ashes removed, coal put on, and the draught again regulated to meet the conditions of a cold, mild, clear or cloudy day, as the case may be, and it will require no further attention until night.

A Perfect Apparatus must include; First, an economical, durable heater, simple in management, easily cleaned, and capable of maintaining a steady temperature for eight or ten hours without attention: Second, mains of ample size so arranged as to properly distribute the heat in the different compartments: Third, radiating pipes so placed as to maintain an even temperature in all parts of the house and to keep up an active circulation of the heated air, thus producing a natural atmosphere. For private and commercial greenhouses the most satisfactory method of heating is by an open tank hot water apparatus. This embodies the requirements necessary to success to a greater degree than any other system, and at the present low prices of materials is comparatively inexpensive.

Other Systems have many objectionable features. Brick flues and saddle heaters leak gas and smoke in the houses and do not distribute the heat properly, while the conical hot water heaters are deficient in fire surface and therefore are extravagant in the use of fuel. The system of Hot Water under pressure is well adapted to some special cases but cannot be recommended for ordinary purposes. That of heating by low pressure steam is well adapted to very large commercial ranges and to large conservatories in parks and on private places where a night attendant can be kept in charge of the fires, and to turn on and shut off steam to the radiating pipes as the changing outside temperature may require.

OUR OPEN TANK SYSTEM OF HOT WATER HEATING.

The Apparatus consists of an especially designed and constructed heater, radiating pipes and fittings. The heater is of a size sufficient to heat the required amount of radiating surface and is connected at the top and bottom to the flow and return mains. From these mains branches are taken to the coils of radiating pipes in each compartment.

The Coils are composed of two or more pipes conveniently placed along the sides, or under the benches or tables, inclined enough to insure a continuous circulation, and are connected at the highest point to one of our patent pipe-header and automatic air-valves to permit the escape of the air which accumulates in the pipes, and at the lowest point with branches which connect them with the flow and return mains. In small lean-to houses a single pipe coil is generally sufficient. But in large conservatories and greenhouses of the "Even-span" and "Three-quarter span" class, two or more coils are placed in each house or compartment to insure an even temperature throughout.

The Expansion Tank. The water contained in an apparatus expands about one twenty-third of its volume when heated from 40° to 212° Fahrenheit. To prevent the overflow and waste of this water, an open expansion tank is located as nearly over the heater as practicable, above the highest pipe in the system, and is connected by a pipe of suitable size to the return main. It is also connected to the water supply, and is provided with a ball float feed valve, which automatically replaces the water lost by evaporation. There is also a glass water column, and an overflow pipe leading to a nearby sink, gutter, or waste pipe.

ESTIMATES.

On receipt of the following information we will furnish an estimate of the cost of a suitable heating apparatus put in complete; or, the cost of a heater, pipes and necessary fittings, f.o.b. N. Y.; and where local mechanics are to set up the apparatus, we will furnish a working plan drawn to scale, together with all necessary information.

Give a rough sketch of the house or houses, showing all dimensions: viz., length, width, height to ridge and height of sides.

State whether the sides are to be wood, brick or glass, and give the heights of such wood, brick and glass parts.

State if building paper is to be used in wood sides, and whether single or double boarded.

Show the proposed arrangement of the benches, paths and doorways, and location of partitions, if any.

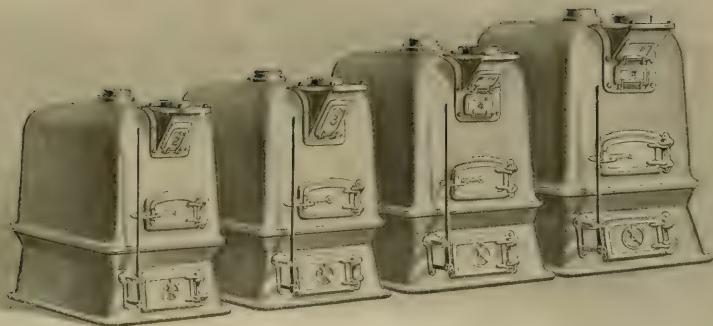
Mark the desired location of the fire room and chimney; also points of the compass.

State the night temperature required in each house or compartment, during coldest weather, or state for what purpose houses are to be used, and we will determine suitable temperatures.

If intended for a grapery or fruit-house, state the month that forcing is to be commenced.

PRICES.

*A price list will be found in this Catalogue in connection with
the description of each article.*



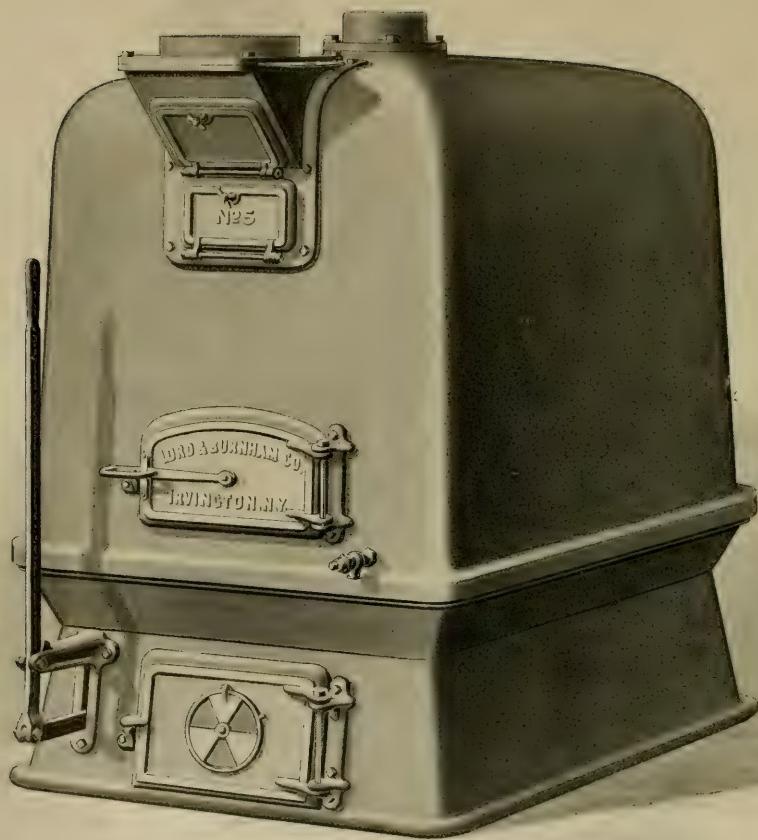
LORD & BURNHAM CO.'S IMPROVED STANDARD HOT WATER HEATER.

This heater was first put on the market twenty years ago, and met with marked favor at that time. Changes were made in its design and construction from time to time as faults became apparent or improvements were suggested by actual use. Its popularity and sale increased year by year until large numbers are now in use in dwellings, private greenhouses, florist establishments and other buildings, all over the country.

Improvements in construction have recently been made, necessitating a new set of patterns. The small tubes formerly used, which required frequent cleaning to be effective, have been omitted, and a series of fire channels, which are self-cleaning, and better fire surface substituted in their place; also the return flue which connects the fire box to the smoke outlet has been doubled in length.

In its economy in the use of fuel, its durability of construction, its arrangements for easy firing and cleaning, and in the length of time which it will maintain an even temperature, our Improved Hot Water Heater has no superior.

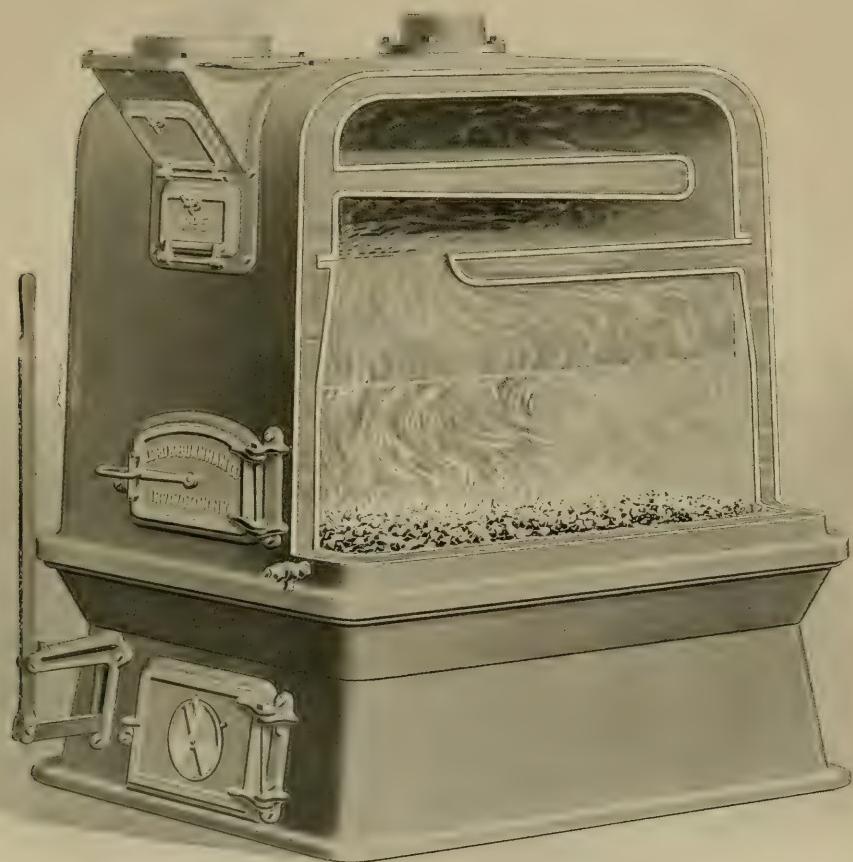
The features of design which give this heater the great efficiency and economy which we claim for it are shown clearly in the succeeding pages.



LORD & BURNHAM CO.'S IMPROVED STANDARD HOT WATER HEATER.

Perspective view showing front and side with the flow and smoke pipe connections ; cleaning, fire box and ash pit doors, lever for shaking and dumping grates, and draw-off cock.

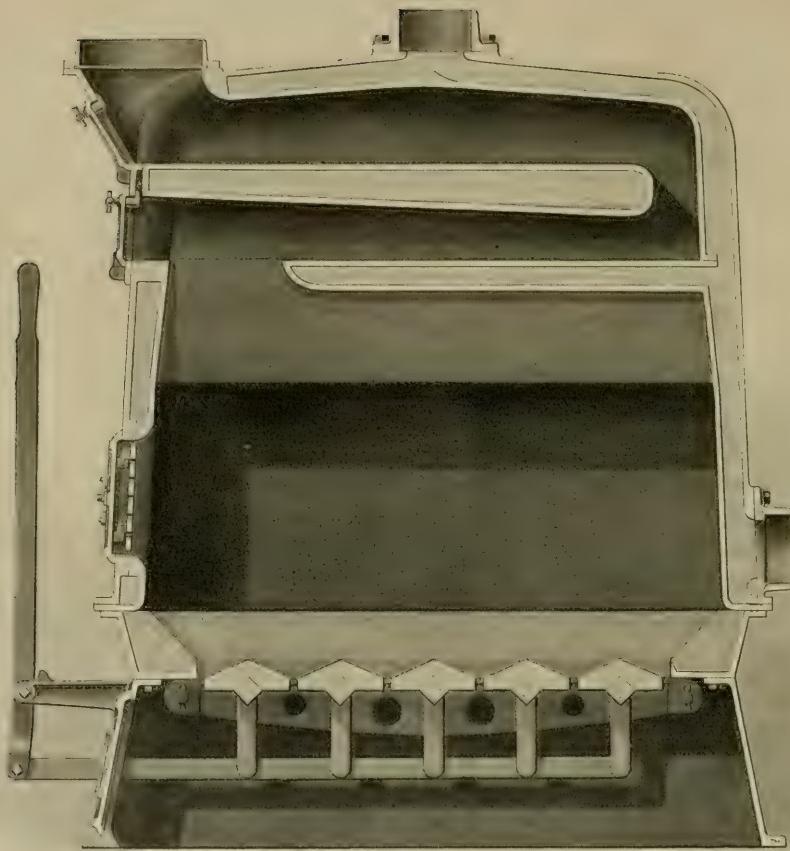
For description see page 17.



LORD & BURNHAM CO.'S IMPROVED STANDARD HOT WATER HEATER.

Perspective and part section view showing large combustion chamber, deep fire channels, and double return flue.

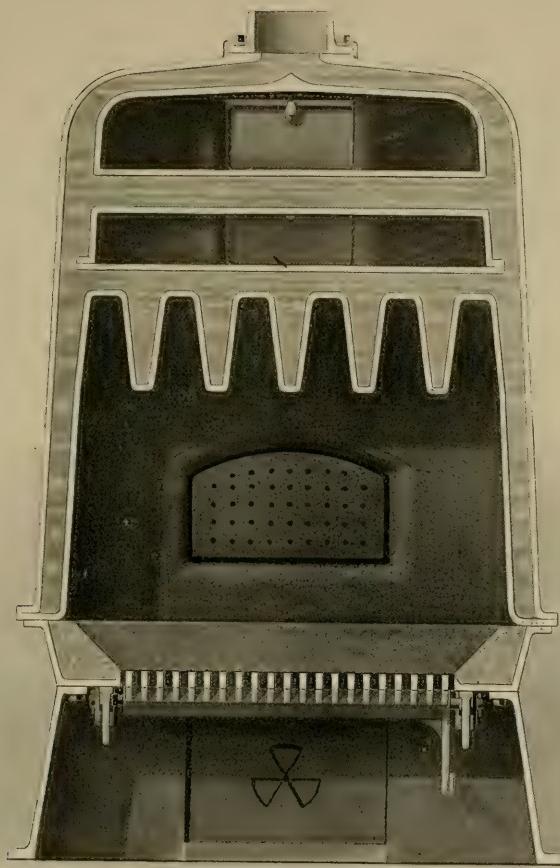
For description see page 17.



LORD & BURNHAM CO.'S IMPROVED STANDARD HOT WATER HEATER.

Full longitudinal section showing large fire-box, combustion chamber, baffle-plate and double return flue, deep fire channels, flow and return flanged connections and base with grates and fire-brick.

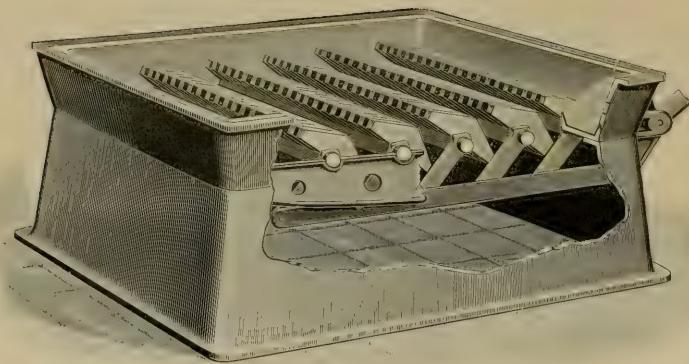
For description see page 17.



LORD & BURNHAM CO.'S IMPROVED STANDARD HOT WATER HEATER.

Full cross section showing water ways between the fire channels, a coal surface in the fire box fifty per cent. larger than the area of the grates and large direct heating surfaces.

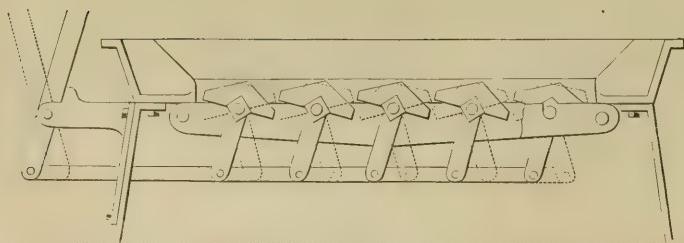
For description see page 17.



LORD & BURNHAM CO.'S IMPROVED STANDARD HOT WATER HEATER.

Showing base and grate, with grate in dumping position.

For description see page 17.



LORD & BURNHAM CO.'S IMPROVED STANDARD HOT WATER HEATER.

Showing action of our improved anti-clinker rocking and dumping grate.

For description see page 17.

DESCRIPTION OF LORD & BURNHAM CO.'S IMPROVED STANDARD HOT WATER HEATERS.

Referring to the foregoing illustrations the following points will be seen :—

First: The fire box is made unusually deep, giving ample space above the coal for perfect combustion of the gases, and has a coal area 50 per cent larger than that of the grates. This provides a large space for the fuel required to maintain an even temperature during long winter nights, and economizes its use by spreading the products of combustion over the additional direct heating surface obtained.

Second: The surface directly over the fire box is composed of deep fire channels running lengthwise of the heater. The sides of these channels are inclined towards the fire so that the heat impinges against them with great force, forming a series of fire currents through the channels in close contact with the fire surface, and materially increasing its effectiveness.

Third: The enlarged area of the fire-box, and the use of the fire channels, as described above, give to this heater a direct fire surface, in proportion to size of grate, of nearly twice the usual amount found in other heaters of this type, and imparts to the water surrounding the fire box nearly the entire heat of the fire.

Fourth: The fire box is connected with the smoke pipe through a wide U shaped flue extending twice the length of the heater ; the lower chamber of the flue being separated from the upper chamber by a baffle plate which checks the flow of the heat from the fire box, turning it abruptly down its inclining surface. Thus most of the heat escaping from the fire box is absorbed by the water surrounding this flue, securing as low a temperature in the smoke pipe as is consistent with an efficient draught.

Fifth: The grates are an important feature of the heater (see cuts on pages 14, 15, 16), being constructed on the most approved plan, and properly proportioned to the fire surface. They provide liberal space for the passage of air for combustion, and combine the greatest ease of management with durability. They consist of a series of supporting bars placed crosswise of the fire box, and protected from the action of the fire by means of short cross bars so placed as to admit air above them. The short bars are beveled on top both ways, forming sharp apexes over the supporting bars which when moved backward and forward by the process of shaking, disturb the bed of coal, loosening and discharging the clinkers and ashes into the ash pit, the beveled surfaces materially assisting in the operation and in keeping the grates clean.

Sixth: The flow and return pipe connections on our new patterns are made with flanged joints in such manner that the heater can be readily disconnected without changing or breaking the pipes and fittings, or danger of injury to the heater whenever any alteration or addition to the apparatus is desired. The circulation is free and rapid. The water spaces in the heater lead directly to the flow outlet so that the water rises naturally when warmed and passes into the flow pipe. The single outlet is placed at the highest point of the heater, and is of ample size to pass all the water of circulation. The friction is reduced, and the rapidity of the circulation increased by the use of a single connection instead of several small connections, especially so, when the latter are placed on the sides of the heater.

For dimensions, capacities and prices see page 18.

**LORD & BURNHAM CO.'S IMPROVED STANDARD
HOT WATER HEATER.**

DIMENSIONS, CAPACITIES AND PRICES.

Number of Heater.	Length, Inches.	Width, Inches.	Height, Inches.	Grate, Sq. Feet.	Smoke Pipe, Inches.	Maximum Capacity.		Shipping Weight, lbs.	Price List.
						4 in. Pipe.	2 in. Pipe.		
2	32	25	45½	2	6	450	720	1,350	\$125.00
3	34½	27¾	49¼	2½	7	650	1,040	1,650	155.00
4	40	30¾	55	3½	8	1,050	1,680	2,200	210.00
5	48½	38¾	59½	5¼	9	1,650	2,640	3,300	275.00

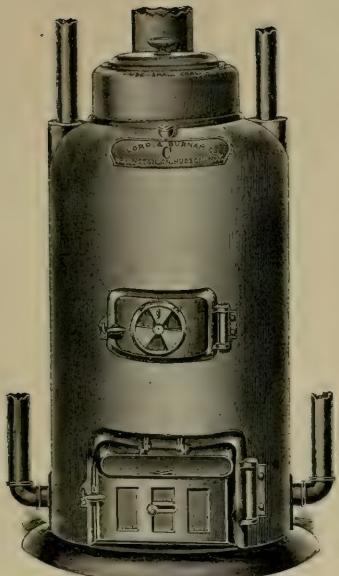
DOUBLE HEATERS.

Two No. 4	40	61½	55	7	Two 8 in.	2,100	3,360	4,400	\$420.00
Nos. 4 & 5	48½	69½	59½	8¾	8 in. & 9 in.	2,700	4,320	5,500	485.00
Two No. 5	48½	77½	59½	10½	Two 9 in.	3,300	5,280	6,600	550.00

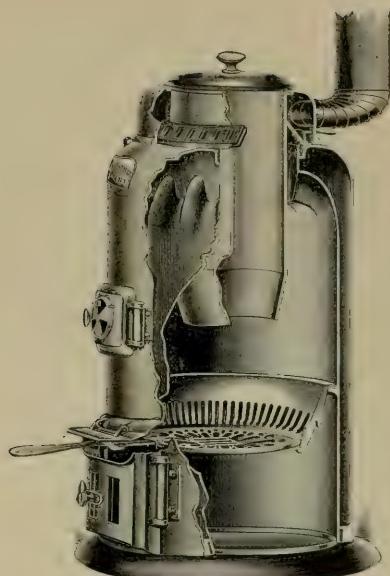
Heaters Nos. 2, 3 and 4 are provided with hubs for 4 inch external diameter cast iron pipe, they being 4½ inch inside diameters. The hubs on heater No. 5 are for 4 inch internal diameter cast iron pipe, they being 5¼ inch inside diameters. These heaters will be provided with flanges for wrought iron pipe, when ordered, without additional expense.

For description see pages 11 and 17.

For illustrations see pages 12, 13, 14, 15 and 16.



FRONT ELEVATION.



SECTIONAL VIEW.

LORD & BURNHAM CO.'S SELF-FEEDING HOT WATER HEATER.

These heaters are made in three sizes, and are designed to warm small greenhouses, conservatories, baths and other buildings, where our regular heaters would be larger than required.

They are so designed as to give ample heating surface to the size of the grate, and being furnished with a magazine for coal, they will run from eight to ten hours, and will require no more attention than an ordinary parlor stove.

They are fitted with Anti-Clinker Grates.

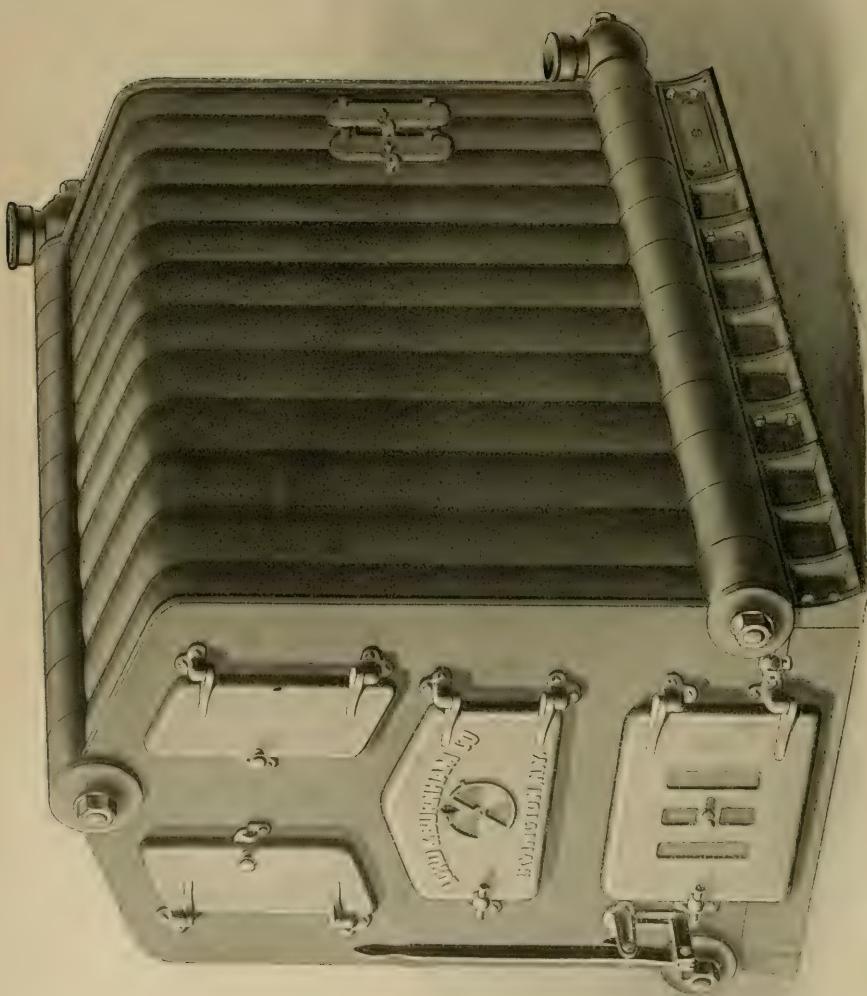
This heater is superior to any other of its kind on the market, in material and workmanship used in its construction, as well as its heating qualities.

DIMENSIONS, CAPACITIES AND PRICES.

Size.	Height over all.	Height to Flow Pipe	Height to center of return Pipe.	Outside Diameter of Boiler.	Diameter of Fire Pot.	Diameter of Grate.	Size of Smoke Pipe.	Shipping Weight.	Maximum Capacity.		Size of Opening for Wrought Iron Pipe.	Price List.
									4 in. pipe.	2 in. pipe.		
A	37	32	2	16	12½	8	5	375	100	160	1¼	\$40.00
B	42	36	2¾	20½	17	11½	5½	600	200	320	1½	65.00
C	47	40	4¼	24	20	14	6	800	300	480	2	80.00

LORD & BURNHAT CO.'S IMPROVED SECTIONAL HOT WATER HEATER.
Perspective view of flow and return connections, grate shaking and dumping lever, fire box, ash pit and cleaning doors and base.
For description see page 24.

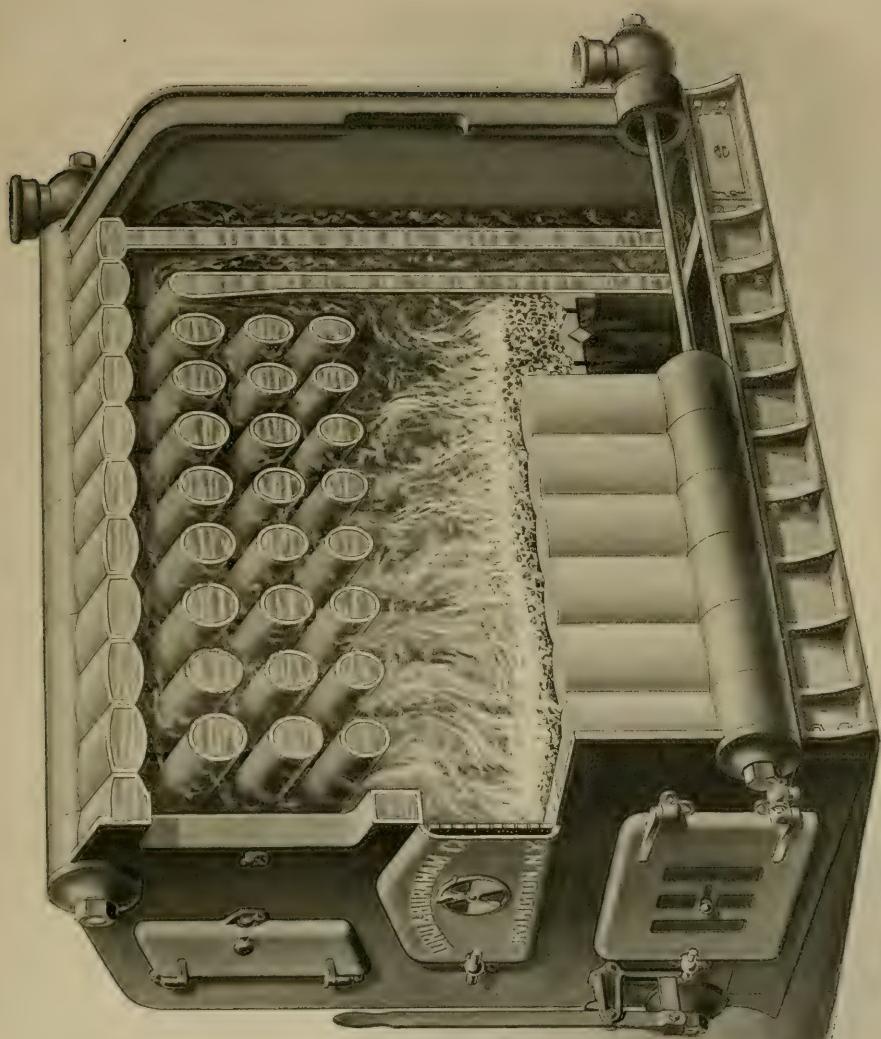
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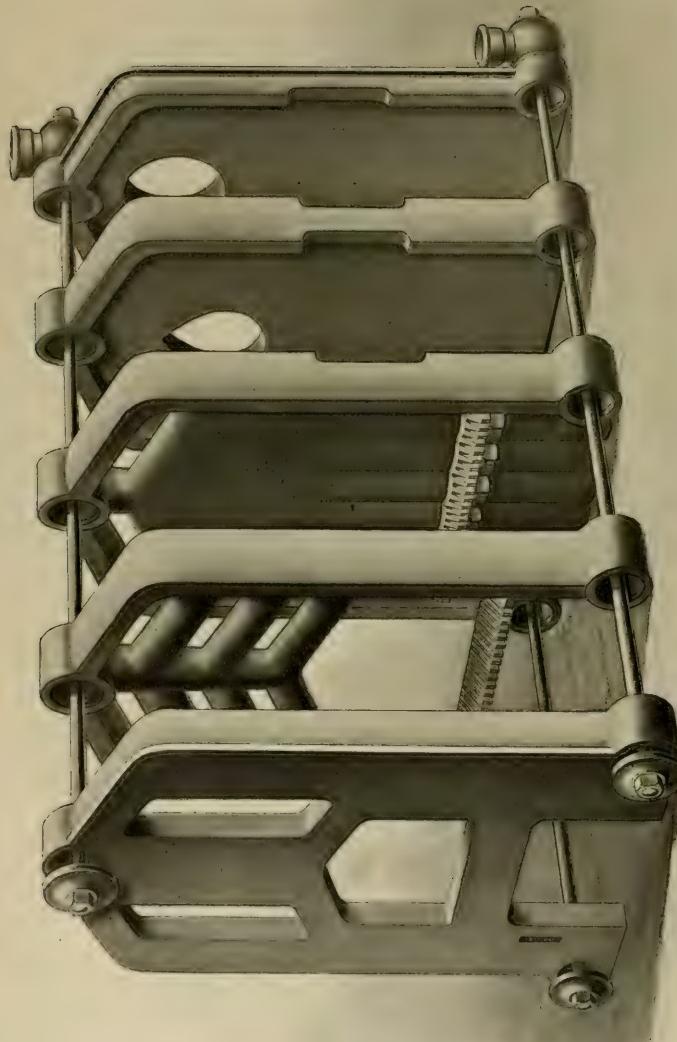


LORD & BURNHART CO.'S IMPROVED SECTIONAL HOT WATER HEATER.

Part section view showing large combustion chamber, water tubes, indirect flue and enormous direct heating surface.

For description see page 24.

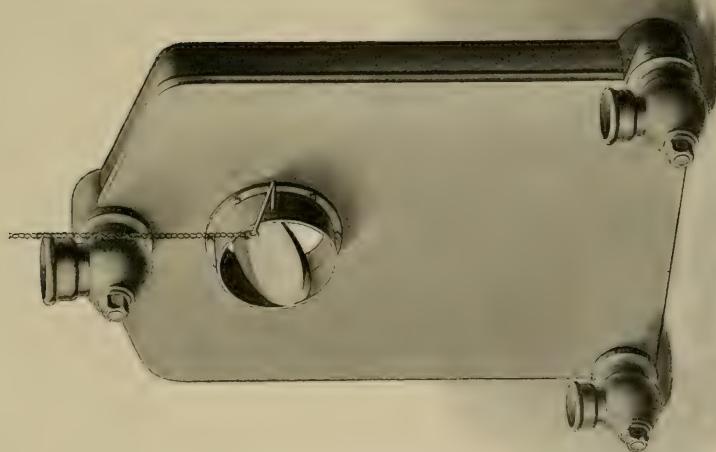




LORD & BURNHAM CO.'S IMPROVED SECTIONAL HOT WATER HEATER.

View of the several sections showing front and rear, grate and indirect or baffle-plate sections, flanged elbows and method of fastening together with tie bolts,

For description see page 24.



LORD & BURNHAM CO.'S IMPROVED SECTIONAL HOT WATER HEATER.

Two sections showing rear section and indirect or baffle-plate section ; also direct and indirect dampers and method of operating.

For description see page 24.

DESCRIPTION OF LORD & BURNHAM CO.'S IMPROVED SECTIONAL HOT WATER HEATER.

The increasing demand for greenhouses of large dimensions requires a boiler of large capacity to economize in the size of the fire room, the cost of installation and fuel consumption.

Our long experience with hot water and steam heating apparatus, constant investigation and experiments to improve such apparatus, present to us the following as the principle requisites for such a heater.

First: It should be simple in construction and easily managed.

Second: It should contain a large combustion chamber with a large amount of heating surface, with which the fire comes in direct contact.

Third: The water ways should be well proportioned, symmetrical, and conducive to as nearly a vertical circulation as possible.

Fourth: It should be free from small horizontal flues which become clogged with soot and ashes, rendering them useless.

Fifth: It should be made in sections which can be readily increased in number to increase its capacity, when increasing the length or number of houses to be heated, and to which repairs can be made quickly and inexpensively.

Our Improved Sectional Hot Water Heater has been especially designed to meet these requirements, and by practical use during the past two years has been demonstrated to be the best and most economical heater in use to-day for large conservatories, commercial greenhouses and other buildings.

It is simple in construction, complete in itself, and requires no masonry setting, except the usual brick bed or foundation. It has a larger direct heating surface per square foot of grate than any similar heater made, equaling in effective surface standard tubular steam boilers; while the cost of setting up is reduced to a minimum compared with such boilers, or with other heaters of equal capacity.

This heater is self-cleaning, as that portion which is above the grates is one vast combustion chamber. The numerous water tubes therein cannot become insulated with black soot, as the flames and hottest gases come in contact with all their surfaces, and, consuming the soot, convert it into white feathery ashes.

All the water-ways are properly proportioned ; a sharp inclination is given the water tubes, which insures a free vertical circulation without forcing.

A direct draught and damper is provided to be used while starting the fire, after which, the indirect flue and damper are used. By this means the gases are retained until combustion is complete, the products then pass through the double vertical indirect flue, where the heat is absorbed by the returning cool water surrounding this flue, and escape to the chimney at as low a temperature as is consistent with a good draught.

Referring to the cut on page 21 it will be noticed that the lowest line of tubes are the smallest in diameter, the second line larger, and the top line the largest in diameter : this permits the flames to impinge them on every side and with equal force on all. By enlarging the space above the tubes, we insure an even temperature about all the tubes, and a complete circulation of the flames and gases, by drawing them directly to the top before passing to the rear and into the indirect flue, thereby thwarting the tendency to pass to the flue by the shortest route, or in a straight line from the bed of coals to the flue opening. Thus it will be understood that this heater obtains the highest percentage of efficiency possible from the fuel consumed. In the vertical indirect flue of this heater the products of combustion, mostly white feathery ashes, precipitate to the passage at the bottom, and are removed through a small door in the base, while in other heaters the soot and ashes fill up the horizontal flues, render the surfaces useless, and destroy the draught.

Our heater has no threaded nipple connections to burn or rust out. The sections are complete in themselves and readily admit of increasing their number to increase the heating surface and grate area. They are fastened together with three tie-bolts passing through the water-ways. These having the same temperature as the sections themselves, there is no trouble from unequal expansion, contraction, or leaky joints. The faces of the joints are ground to a perfect fit, after which numerous circular grooves are milled into them. The sections are then drawn together with asbestos gaskets between them which are crimped into the grooves making an absolutely water tight joint.

This simple joint has great advantages over the threaded nipple and header connections of heaters of other makes, whose wrought iron nipples rust out, and whose great number of joints between sections and headers makes their method of setting up very expensive. From such heaters it is impossible to take out any section for repairs, without first disconnecting the entire set of sections and removing all the headers. It will then be found that the nipples have rusted in so that it is necessary to cut them out with hammer and chisel, a process which generally does much harm to the sections themselves. If it is desired to increase the capacity of the heater by connecting additional sections, an entire new set of headers will be necessary as the first set will be too short and must be thrown away. While by simply removing the nuts from the tie-bolts in our heater, any section may be removed for repairs, if necessary ; or, by lengthening the tie-bolts, new sections of heating and grate surface may be added, to increase its capacity, in a very short time.

The grates are our anti-clinker shaking and dumping pattern, strong and durable, and so constructed that the air circulates freely around every part, insuring a sufficient current to the fire-box and affording the least possible chance for warping or burning out, and operated by a single lever at the front of the heater.

Each grate section of this heater has its own section of grate, fitted crosswise, which permits the grate area being increased when increasing the number of heating sections ; whereas in other makes an entire new set of grate bars are necessary.

The pipe mains can be connected to either or both ends of the heater as may be convenient, by means of flanged elbows, which are fitted to the ends of the water ways in the same manner that the sections are joined together, and are held in place by the tie-bolts. The elbows and flanges shown on the opposite ends, are interchangeable. The heater may be disconnected from the system without breaking the pipes, fittings or any joints, simply by removing the tie-bolts.

In offering this heater to florists and others we are convinced it is the most durable and economical Hot Water Heater yet put on the market. Being made of cast iron it will resist corrosion and the impurities of water, and cannot blister or weaken in the fire surface. Being a Sectional and Water Tube Heater there are no stayed or braced surfaces to give out.

For illustrations see pages 20, 21, 22 and 23.

For dimensions, capacities and prices see opposite page.

LORD & BURNHAM CO.'S IMPROVED SECTIONAL HOT WATER HEATER.

DIMENSIONS, CAPACITIES AND PRICES.

Number of Sections.	Length, Inches.	Width, Inches.	Height, Inches.	Grate, Sq. Feet.	Smoke Pipe, Inches.	Maximum Capacity,		Shipping Weight, lbs.	Price List.
						4 in. Pipe.	2 in. Pipe.		
9	68	48	75	10	15	3,500	5,600	7,655	\$605.00
10	76	48	75	12	15	4,200	6,720	8,335	670.00
11	84	48	75	14	15	4,900	7,840	9,015	735.00
12	92	48	75	16	15	5,600	8,960	9,695	800.00

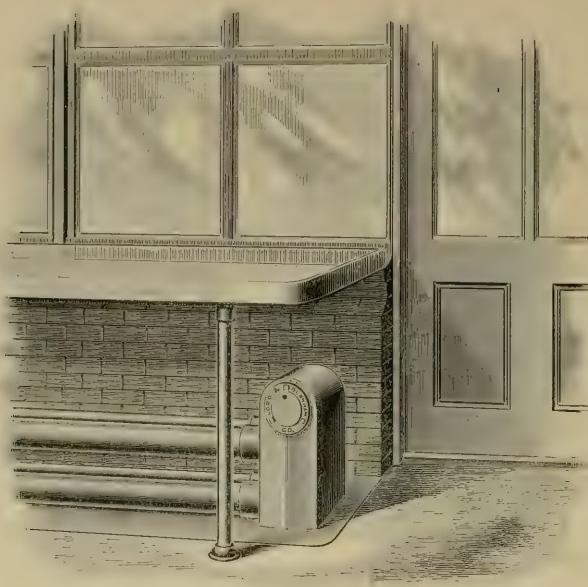
DOUBLE HEATERS.

Two No. 9	68	96	75	20	Two 15	7,000	11,200	15,310	\$1,210.00
" 10	76	96	75	24	" 15	8,400	13,440	16,670	1,340.00
" 11	84	96	75	28	" 15	9,800	15,680	18,030	1,470.00
" 12	92	96	75	32	" 15	10,200	16,320	19,390	1,600.00

Prices for less number of sections on application.

For description see pages 24, 25 and 26.

For illustrations see pages 20, 21, 22 and 23.



LORD & BURNHAM CO.'S PATENT PIPE HEADER AND AUTOMATIC AIR VALVE.

The above cut illustrates the Pipe Header and Automatic Air Valve which we have recently introduced and patented. A large number have been placed during the past two years, and all of them are giving perfect satisfaction. The construction of the valve is shown by Fig. No. 4, on next page. The seat of the valve being made of soft metal, it is indestructible and not likely to get out of order.

Its advantages are as follows :—

It is positive in operation, entirely freeing the apparatus from accumulations of air.

It saves the gardener much time and annoyance opening air cocks.

It obviates the necessity for open tanks and pipes standing above the tables taking up plant space, which are unsightly in appearance, and frequently allow the hot water to overflow, destroying the plants around them.

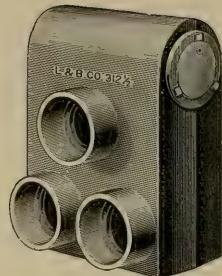
The cost of the header is more than offset by the saving in other fittings, and in the time saved by the fitter in the convenience of making up the coils and the less number of joints required, while the surfaces of the header are as valuable for radiation as any other surface.



No. 1. Price \$4.50



No. 2. Price \$5.50



No. 3. Price \$5.75



No. 4. Price \$6.00



No. 5. Price \$7.50



No. 6. Price \$7.75



No. 10. Price \$4.50

LORD & BURNHAM CO.'S PATENT PIPE HEADER AND AUTOMATIC AIR VALVE.

Nos. 1, 2, 3, 4, 5 and 6 are furnished with Sockets for 3 1-2 in. Pipe.

Nos. 10 and 20 are furnished with Sockets for 2 in. Pipe.

Sockets can be furnished on both sides of the headers, or can be made to fit any size of pipe at proportionate prices.

No. 10. Headers of this size can be furnished with sockets for 2 inch wrought pipe, arranged like any of the above, spaced 4 $\frac{1}{2}$ inch centers, cost, 15c. extra for each additional socket.

No. 20. Headers of this pattern can be furnished with nine or a less number of sockets for 2 inch wrought pipe, 4 $\frac{1}{2}$ inch centers, arranged as desired, at 15c. extra for each additional socket.



No. 20. Price \$5.75

LORD & BURNHAM CO.'S CAST IRON HEATING PIPES AND FITTINGS.

The greenhouse pipes and fittings illustrated on the following pages are made from special patterns, are extra heavy, strong, neatly finished, and standard for greenhouse heating. The $3\frac{1}{2}$ inch pipe is made in 9 foot lengths, weighing 11 to 12 lbs. to the foot; it is 4 inches in its outside diameter, and is used for the radiating coils. The sockets of $3\frac{1}{2}$ inch pipes and fittings measure $4\frac{1}{2}$ inches internal diameter. By using this long pipe there are less joints, chairs and supporting piers needed than when short pipe is used. The 4 and 5 inch pipes are made in 12 foot lengths, and are used for mains. The sockets are $5\frac{1}{4}$ and $6\frac{3}{8}$ inches internal diameter, respectively. We also furnish larger sizes of pipes when required.

The pipes are all cast on end, and are entirely free from the large bunches in the middle and from seams along the sides found on pipes cast in a horizontal position. For this reason they are the smoothest, both inside and outside, and the straightest pipes in the market.

The $3\frac{1}{2}$ inch internal diameter cast iron pipe has been standard for greenhouse heating for many years, and embraces the following advantages over any other:

First: It is more durable than wrought iron pipe, costing little or nothing for repairs.

Second: The permanent character of the work insures against accidents and possible serious damage to the plants.

Third: It holds enough warm water to steady the temperature of the greenhouse in changeable weather, and when making new fires.

Fourth: The friction is only one half what it is in two inch pipe, and still less in proportion compared with smaller sizes. The rapidity of the circulation is increased in proportion as the friction is diminished.

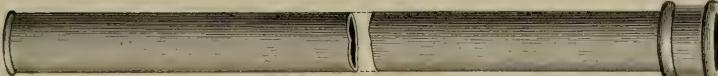
Fifth: The hot water circulating faster in the large pipe maintains a more equal temperature in the farther end of the house.

Sixth: Lack of friction in the pipes to be overcome and a quicker circulation of the hot water, economizes the quantity of fuel required.

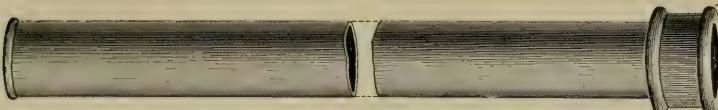
LORD & BURNHAM CO.'S CAST IRON HEATING PIPES AND FITTINGS.



3½ inch Pipe. 9 foot lengths, \$1.80 each.



4 inch Pipe. 12 foot 4 inch lengths, \$2.96 each.



5 inch Pipe. 12 foot 4 inch lengths, \$3.95 each.

The following fittings are made with Hubs and Spigots for 3 1-2 inch Pipe only.



No. 1. Price 90c.



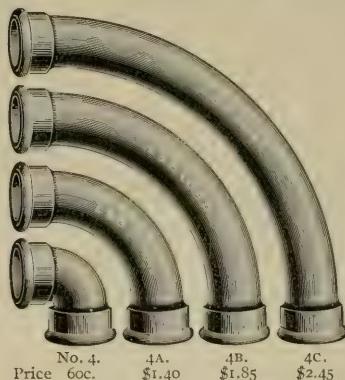
No. 2. Price 95c.



No. 3. Price 60c.



No. 5. Price 60c.
1/2 Bend.



Price 60c. No. 4. \$1.40
4A. \$1.85 4B. \$2.45
4C.



No. 5 1/2. Price 55c.
1/20 Bend.



No. 6. Price 55c.
1/6 Bend.



No. 6 1/2. Price 55c.
1/10 Bend.

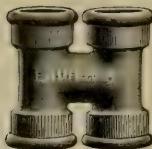


No. 7. Price 90c.

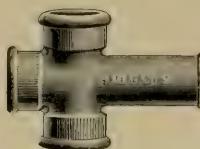


No. 7 1/2. Price \$1.30

LORD & BURNHAM CO.'S CAST IRON HEATING PIPES AND FITTINGS.



No. 8.
Price \$1.40



No. 9.
Price \$1.20



No. 10.
Price \$1.00



No. 11.
Price \$1.65



No. 12.
Price \$1.35



No. 13.
Price \$1.60



No. 14.
Price \$1.20



No. 15.
Price \$1.35



No. 16.
Price \$1.60.



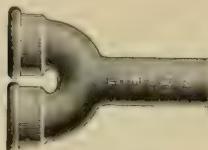
No. 17.
Price \$1.65.



No. 17 1/2.
Price \$1.70.



No. 18.
Price 90c.



No. 19.
Price \$1.15



No. 20.
Price \$1.10



No. 21.
Price \$1.35

LORD & BURNHAM CO.'S CAST IRON HEATING PIPES AND FITTINGS.



No. 22.
Price \$1.55



No. 23.
Price \$1.25



No. 23½
Price \$1.35



No. 24—6 inch.
Price 80c.



No. 24—8 inch.
Price 85c.



No. 24—12 inch.
Price \$1.05



No. 24—16 inch.
Price \$1.20.



No. 25.
Price \$1.20.



No. 26.
Price \$1.80



No. 27.
Price 45c.



No. 28.
Price \$2.05



No. 29.
Price \$2.10



No. 30.
Price \$1.10

LORD & BURNHAM CO.'S CAST IRON HEATING PIPES AND FITTINGS.



No. 40.
Price \$1.05.



No. 33.
Price 75c.



No. 34.
Price 15c.

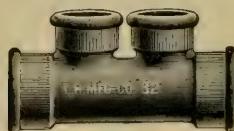


No. 60.
Price 6cc.

Five Inch, Four Inch, and Reducing Fittings.



5 x 3½ inch.
No. 31. Price 75c.



5 x 3½ Inch.
No. 32. Price \$1.85



3½ x 5 Inch.
No. 35. Price 95c.



5 x 3½ Inch.
No. 36. Price \$1.90



3½ x 2 Inch.
No. 37. Price 50c.



4 x 3½ Inch.
No. 38. Price \$1.00



4 x 3½ Inch.
No. 39. Price 75c.



4 x 3½ Inch.
No. 41. Price \$1.30



4 x 3½ Inch.
No. 42. Price \$1.65



4 Inch.
No. 43. Price \$1.30



4 x 3½ Inch.
No. 44. Price \$1.40



4 Inch.
No. 45. Price 80c.

LORD & BURNHAM CO.'S CAST IRON HEATING PIPES AND FITTINGS.



4 x 3 $\frac{1}{2}$ Inch.
No. 46. Price 70c.



5 Inch.
No. 47. Price \$1.10



5 Inch.
No. 48. Price \$1.60



4 Inch.
No. 54. Price \$1.10



4 Inch.
No. 55. Price \$1.25



5 x 4 Inch.
No. 51. Price \$2.30



5 Inch.
No. 49. Price 90c.



4 Inch.
No. 53. Price 70c.



3 $\frac{1}{2}$ Inch Sleeve.
Tapped $1\frac{1}{4}$, $1\frac{1}{2}$, 2 or $2\frac{1}{2}$ inches.
No. 102. Price 65c.



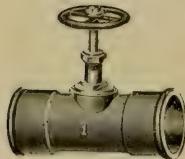
5 x 3 $\frac{1}{2}$ Inch.
No. 93. Price \$1.85

The illustrations given show the usual $3\frac{1}{2}$ inch fittings required for making up pipe coils for greenhouse heating; also many larger fittings for the mains. A large number of special fittings are not shown by the illustrations. For fittings not illustrated, send a diagram of same, marking the size of all the branches, and they can usually be supplied.

FITTINGS FOR 2 INCH WROUGHT PIPE.

For the convenience of florists and others who desire to use 2 inch pipe, we have recently added a large number of fittings with sockets for caulked joints, including two, three and four way branches and headers, return bends, return bends with back outlets and reducing fittings. Their use in place of screwed fittings effects a considerable saving in the expense of making the coils. Lists and prices will be sent on application.

LORD & BURNHAM CO.'S IRON BODY, BRASS MOUNTED
STOP VALVES.



No. 1.



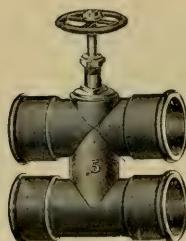
No. 2.



No. 3.



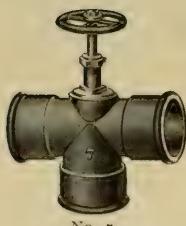
No. 4.



No. 5.



No. 6.



No. 7.

SIZES, DIMENSIONS AND PRICES.

Number.....	1	2	3	4	5	6	7
Size of Valve passage, inches	2½	2½	2½	3½	2½	2½	2½
Inside Diameter of Socket..	4½		4½	4½	4½	4½	4½
Outside Diameter of Spigot..	4	4
Price.....	\$5.00	\$5.00	\$5.00	\$7.00	\$8.00	\$5.50	\$5.75

The above valves are for 3½ inch cast iron pipe only, are especially designed for greenhouse work, and are kept constantly in stock.

No. 5 has a valve to open or close the passage between the upper and lower pipes and is used at divisions in the house, or where it is required to form a return passage between two pipes, and by other valves to stop the flow or shut the water *out of the pipes beyond the valve*.

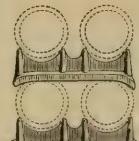
Special valves for smaller or larger size pipe furnished. Prices quoted on application.

LORD & BURNHAM CO.'S STANDARD PIPE CHAIRS.

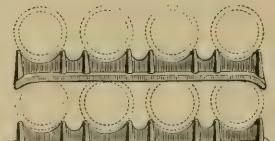
These Pipe Chairs are made for both $3\frac{1}{2}$ inch cast iron and 2 inch wrought iron pipe. The former are $6\frac{1}{4}$ inch center to center and the latter $4\frac{1}{2}$ inch center to center. Prices of the 2 inch chairs given on application.



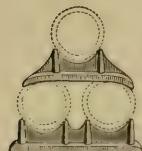
2 Pipes.



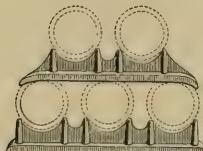
4 Pipes.



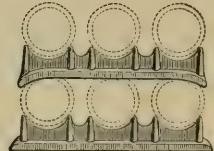
8 Pipes.



3 Pipes.



5 Pipes.



6 Pipes.

PRICE LIST OF STANDARD PIPE CHAIRS FOR $3\frac{1}{2}$ INCH PIPE.

2 Pipes Top Chair	5c.....	Bottom Chair	7c.
3 " " "	9c.....	" "	13c.
4 " " "	9c.....	" "	13c.
5 " " "	15c.....	" "	20c.
6 " " "	20c.....	" "	20c.
8 " " "	35c.....	" "	35c.

LORD & BURNHAM CO.'S ADJUSTABLE PIPE CHAIRS.

The **Adjustable Pipe Chairs** are designed for greenhouses and conservatories having cement or tile floors, where it is not convenient to build supporting piers. The adjustment of 2 inches permits the pipe to be given the proper grade on a level floor.

The standard chairs shown on page 37 are used for the upper pipes.



1 Pipe.
Price 45c.



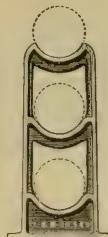
2 Pipes.
Price 65c.



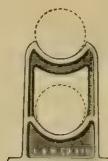
3 Pipes.
Price 85c.



No. 470.
Price, 1 pipe 40c.
Price, 2 pipes 60c.



No. 549.
Price 6cc.

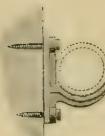


No. 550.
Price 45c.

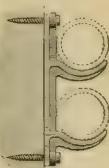
No. 470 is an adjustable support for mains. It is suitable for either 4 inch or 5 inch diameters. Both upper and lower pipes have separate adjustments of 2 inches in height.

Nos. 549 and 550 are standard chairs for the support of single coils of $3\frac{1}{2}$ inch pipe. They are not adjustable.

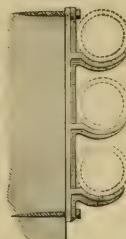
HOOK PLATES FOR 3 1/2 INCH PIPE, FOR USE ON WALLS AND POSTS.



1 Pipe.
Price 15c.



2 Pipes.
Price 30c.



3 Pipes.
Price 45c.

Coach screws are furnished with each hook plate.

LORD & BURNHAM CO.'S VAPOR PANS.

These pans are made to caulk fast to the heating pipes. They are intended to be filled with water, which is evaporated by the heat from the pipes passing through them, for the purpose of increasing the moisture of the atmosphere in stove houses, orchid houses, graperies and houses where unusual humidity is required.

No. 1 is made with removable ends to connect to pipes already in place.

No. 2 is made to connect to pipes when they are first put in place.

They have sockets $4\frac{1}{2}$ ins. in diameter to fit $3\frac{1}{2}$ in. pipe.

Vapor pans are not included in estimates unless mentioned in the specification.



No. 1.—4 ft. long, 7 in. deep, $7\frac{1}{2}$ in wide. Price \$4.50



No. 2.—4 ft. long, 7 in. deep, $7\frac{1}{2}$ in. wide. Price \$4.00

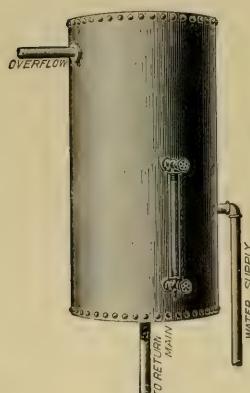
LORD & BURNHAM CO.'S EXPANSION TANKS.

The cuts below show two forms of expansion tanks which we use in connection with hot water heating. They provide for the increase in the volume of the water in a system, due to the expansion as described on page 9. For general use the galvanized round tank is preferred. It is usually placed in the potting room, to avoid taking up valuable space in the greenhouse, and elevated a few feet above the coils.

The cast iron flat expansion tanks are designed for special use in conservatories and greenhouses where there is no potting room attached or other place where an expansion tank can be elevated above the coils.

Both these forms of expansion tanks are decided improvements over the "bottle tanks" and stand pipes heretofore generally used in greenhouses. The latter are necessarily placed so as to cut through the tables taking up plant space; and having no overflow pipes the hot water frequently runs over and destroys the surrounding plants. They not only take up valuable space in the greenhouse and damage the plants, but are extremely unsightly.

LORD & BURNHAM CO.'S GALVANIZED STEEL AUTOMATIC EXPANSION TANKS.



These **Expansion Tanks** are made of heavy steel plates, strongly riveted, heavily galvanized, and are provided with a copper ball float and feed valve, removable cover and glass water column. They are the most perfect tank made for hot water apparatus, the float feed valve automatically maintaining the required quantity of water in the system. They therefore require no attention. The connections are amply large, the overflow being near the top, the feed on the side near the bottom and the expansion connection in the bottom. Automatic valves can not be used where there is no water system. In this case the tanks can be filled by hand.



Single Pipe Flat Expansion Tank.



Two Pipe Flat Expansion Tank.

LORD & BURNHAM CO.'S FLAT EXPANSION TANKS.

The flat **Expansion Tanks** are placed on the heating pipes underneath the benches, and are used when there is no potting room, or other convenient place, for the usual elevated tank.

LORD & BURNHAM CO.'S GALVANIZED STEEL AUTOMATIC EXPANSION TANKS.

CAPACITIES, SIZES AND PRICE LIST.

Capacity in Gals.	Suitable for feet of 3½ Inch Pipe.	Size, Inches.	Price.
10 gal.	500 feet.	12 x 22	\$7.30
15 "	700 "	12 x 34	8.00
20 "	1,000 "	14 x 34	10.70
25 "	1,250 "	16 x 28	11.30
30 "	1,500 "	16 x 34	12.00
40 "	2,000 "	16 x 46	12.60
60 "	3,000 "	18 x 58	22.00
80 "	4,000 "	20 x 58	26.60
100 "	5,000 "	22 x 58	35.90
120 "	6,000 "	24 x 58	40.50
150 "	7,500 "	27 x 60	49.30

WITHOUT AUTOMATIC ATTACHMENTS.

10 gal.	500 feet.	12 x 22	\$4.40
12 "	600 "	12 x 24	4.70
15 "	750 "	12 x 30	5.00
18 "	900 "	12 x 36	5.25
20 "	1,000 "	14 x 30	6.90
24 "	1,200 "	14 x 36	7.15
26 "	1,300 "	16 x 30	7.70
32 "	1,600 "	16 x 36	8.25
42 "	2,100 "	16 x 48	9.10
66 "	33,000 "	18 x 60	17.10
82 "	41,000 "	20 x 60	20.35
100 "	50,000 "	22 x 60	28.00
120 "	60,000 "	24 x 60	31.90

Prices are without water gauges and brasses. These cost \$2.00 extra.

LORD & BURNHAM CO.'S FLAT EXPANSION TANKS.

CAPACITIES, SIZES AND PRICE LIST.

	Capacity in Gals.	Suitable for feet of 3½ Inch Pipe.	Size, Inches.	Price.
Single Pipe.	15 gal.	750 feet.	11 x 48	\$6.50
Two Pipes.	20 gal.	1,000 feet.	15 x 48	8.00

One size larger tank than the radiating pipes require will usually allow for the heater and mains.

For 2 inch pipe allow three times the number of feet given for 3½ inch pipe to each tank.

LORD & BURNHAM CO.'S PATENT STANDARD VENTILATING APPARATUS.

The ventilating machinery here shown is the best for the purpose now on the market. The idea of this form of apparatus was originated by the late Mr. F. A. Lord, the founder of our Company, and was first applied by him for greenhouse ventilating nearly forty years ago. The principle, in different forms, is now used in practically all the apparatus for this purpose. There is no better way of opening and closing sashes in greenhouses. Long lines of sashes can be raised easily and evenly to any desired opening. It is self-locking at any point, and cannot be altered except by turning the operating wheel or crank. It is wholly mechanical, being free from chains, cables and springs which so often get out of order. We use this machinery in all the conservatories and private greenhouses that we build, and furnish large quantities of it for use in churches, factories, pier sheds and armories and for all styles of sky lights. We can confidently say that it is the strongest, best finished and neatest appearing ventilating machinery made.

The apparatus consists of a rocking shaft usually made of one inch steel tubing supported by bearers to the frame work of the building, and continuing its length. As many lines of shaft are used as there are lines of ventilators. The bearers supporting the shaft are placed from six to eight feet apart. Arms and rods are fixed to the shaft opposite each sash, one or more to each sash according to its length, and are fastened to the sash rail of the sash to be opened by means of small cast iron eyes secured by screws.

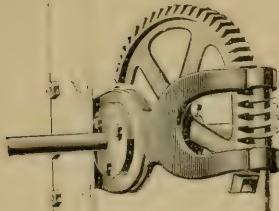
The shaft is made to rock by means of a gear and worm, secured together and to the shaft by means of a yoke. The rocking shaft opens and closes the sash by means of arms and rods. When the sash are open their weight is carried by the rods and arms to the shaft which is held by the gear, worm and yoke in connection with a strong flange which is bolted to the frame work of the building which receives all the weight. This arrangement relieves the hand shaft of any strain other than that necessary to operate the worm in the gear. The hand shaft is made of $\frac{3}{4}$ inch round cold rolled steel shaft, and is provided with a crank or hand wheel. This hand shaft can be brought down from the ridge or a high tower following the angles or curves of the roof by means of beveled gears or universal joints.

The rocking shafts on the various angles or sides of a building can be attached so as to operate as one shaft, by means of universal joints. Lines of ventilation longer than 50° to 60° should have two sets of gears in the line.

For complete arrangement of apparatus see page 45.

LORD & BURNHAM CO.'S PATENT STANDARD VENTILATING APPARATUS.

DESCRIPTION AND PRICES.



Gear Wheel, Yoke, Worm and Collar,
showing same attached to rafter.

This cut shows a section of **Rocking Shaft, Gear Wheel, Yoke, Worm and Collar or Bearing**, attached to a rafter or frame of building. The heads of the three bolts which hold the yoke and collar together at any angle are shown.

These gears are made in three sizes, as follows:—

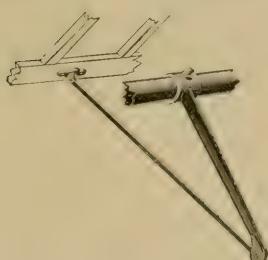
First: Small set, 6 inch diameter for short lines of flat roof ventilators and for light lines of upright side ventilators. Price per set, \$4.00.

Second: Medium size 12 inch diameter for lines of roof ventilators up to 40 feet, and heavy lines of side ventilators. Price per set, \$5.00.

Third: Large size 14 inch diameter for lines of flat roof ventilators up to 60 feet in length. Price per set, \$5.50.

Each price named above for a set of gearing includes the following pieces: Gear wheel, yoke, worm, collar or bearing, operating shaft not exceeding 10 feet in length; also universal stand to hold operating shaft; and crank or wheel with the necessary bolts and screws.

The **arm, rod and hanger** represented by this cut, have been found to be entirely satisfactory for the purpose. The arm being cast in one piece, is neat in appearance, light and strong.



Shaft, Arm, Rod and Hanger.

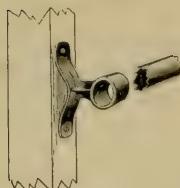
It is held to the rocking shaft by means of a case hardened cup pointed steel set screw, which when screwed up cuts a seat in the shaft for itself and cannot slip. The hanger is fastened to the sash rail by four screws, two on the edge and two on the face. Other forms of hangers to fit special work. The rods are made of square steel. The arrangement of arm, rod and hanger is simple, and they never get out of order. Screws are furnished with each hanger.

The following sizes are kept in stock:—

Arms	8 inch.	Rods 16 inch.	Price per set,	35c.
" 10 "	" 20 "	" "	" "	40c.
" 12 "	" 24 "	" "	" "	45c.
" 14 "	" 28 "	" "	" "	50c.

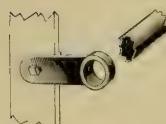
The 10 inch and 12 inch are ordinarily used for roof ventilators.

LORD & BURNHAM CO.'S PATENT STANDARD VENTILATING APPARATUS.



Shaft Bearer for wood rafter
or sash bar.

This **bearer** is used to support the rocking shaft. In rafter houses one is required for each rafter, and for sash bar houses one for each other sash bar. Price 10c. each.



Shaft Bearer for side of iron rafter.

The **bearer** here shown is adapted for use in an iron framed house having bar iron rafters. Price 10c. each.



Universal Joint for turning operating rods at any angle.

These **universal joints** will work at any angle between a straight line and a deflection of 45°. Two of them operating on the same shaft will turn the same at a right angle. They are used on rocking shafts meeting at angles; also to bring the operating shaft down following the angles or curves of the roof.

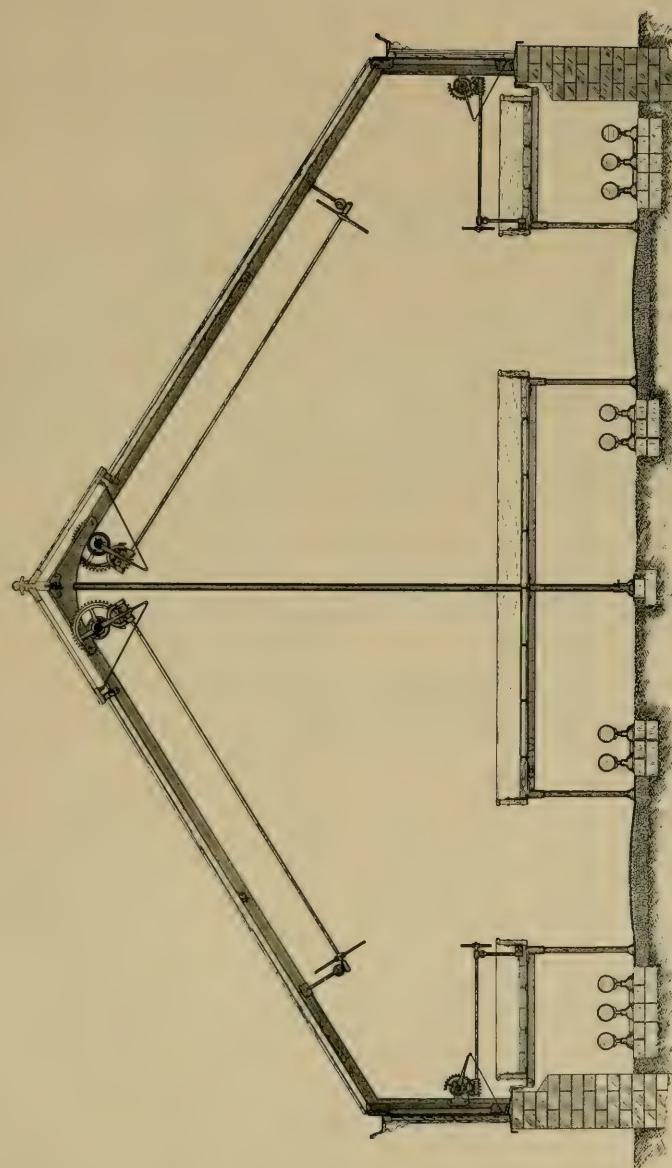
1 universal joint for $\frac{3}{4}$ inch round steel, price \$1.00.
1 " " " 1 inch steel tube, " 1.25.



Shaft and Coupling.

1 inch **pipe shafting**, straightened, coupled and pinned.
Price 8c. per foot.

When writing for estimates or placing orders see page 49.



Cross section of full span patent iron frame greenhouse, on masonry foundation, showing
4 lines of Lord & Burnham Co's Patent Standard Ventilating Apparatus,
iron framed plant beds, also arrangement of heating pipes.

For description and prices of the ventilating apparatus see pages 42, 43 and 44.

LORD & BURNHAM CO.'S PATENT IMPROVED VENTILATING APPARATUS FOR FLORISTS.

By an examination of the accompanying drawings, it will be seen that a pipe post is provided which takes the weight of the sash. The hand shaft which operates the worm is brought down through the post to a convenient height for the operator, where it is brought out at right angles by means of a yoke and mitre gears to receive the hand wheel. The set of mitre gears increases the lifting power of the apparatus about one half. The horizontal part of the hand shaft may be of any length required to reach one of the walks where the hand wheel can be conveniently placed for operation without taking up plant space on the tables. It has all the advantage of our regular apparatus, and does not depend on the framing of the building to carry the weight of the sash. The rocking shaft is supported by bearers attached directly to the sash bars or rafters. With each set of gears a short piece of solid cold rolled steel shaft is furnished with screwed and riveted collars at each end to receive the steel tubing. This forms true bearings for the yoke and gear, and strengthens the shaft.

The bottom of the post has an adjustable foot piece which is attached to a cast iron post or anchor set in the ground. The latter is not shown in the drawing.

The arms, rods and shaft bearers are the same as used with our standard apparatus.

We make two sizes of these gears : *i. e.* 12 inch diameter for lines of ventilation up to 60 feet in length, and 14 inch diameter for lines of ventilation 75 to 100 feet in length.

For complete arrangement of apparatus see page 48.

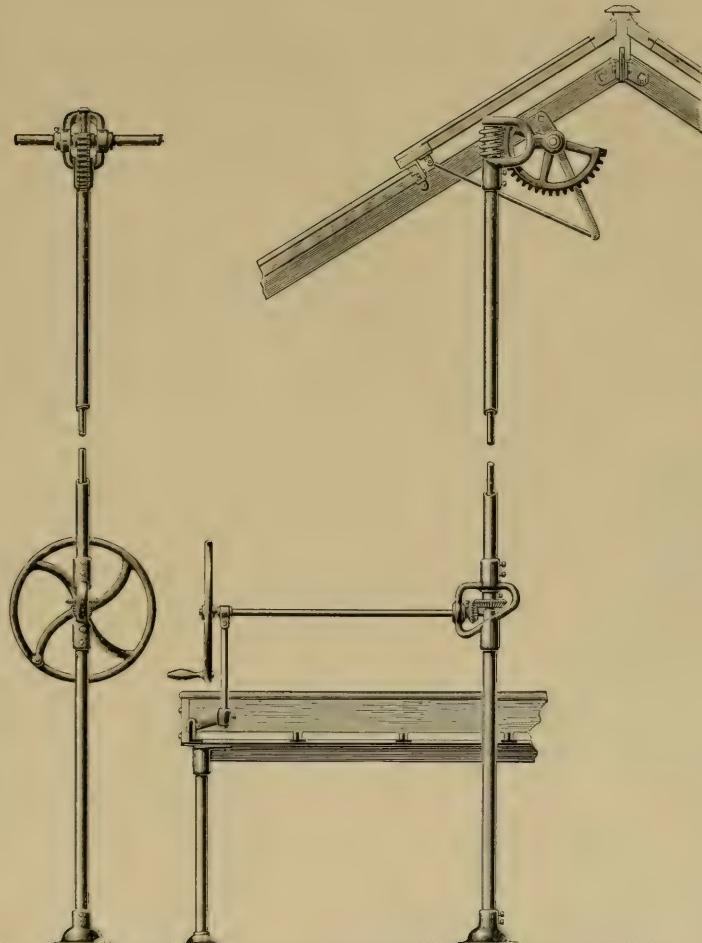
PRICE LIST.

Price of 12 inch gears, including gear, worm, yoke, steel bearing shaft, set beveled gears with frame, operating shaft with hand wheel, upright post with adjustable foot piece, and anchor post, \$6.50.

Price of 14 inch gears, including the same items as enumerated above, \$7.00.

For prices of shaft, arms, etc., see pages 43 and 44.

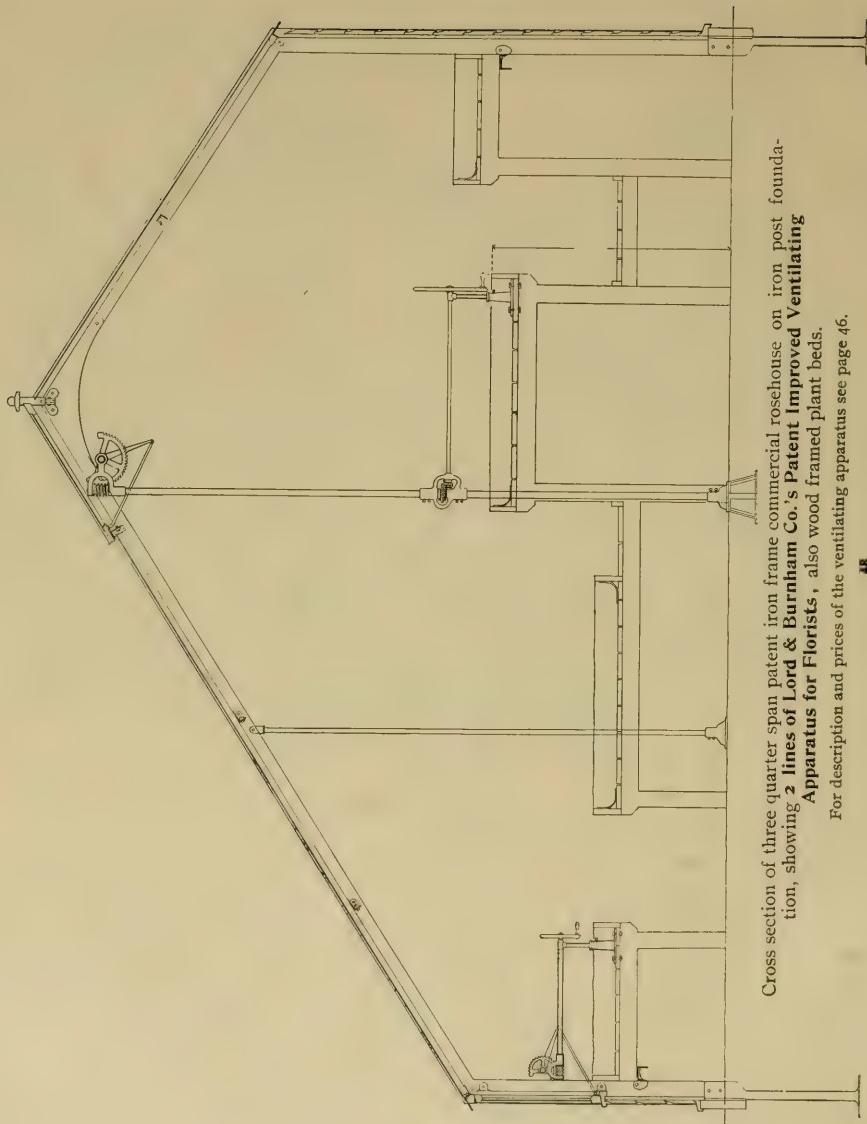
When writing for estimates or placing orders see page 49.



LORD & BURNHAM CO.'S PATENT IMPROVED VENTILATING APPARATUS
FOR FLORISTS.

We call particular attention to this new style of ventilating machinery, adapted for use in sash bar or light framed greenhouses, and for long lines of ventilation up to 100 feet to be operated from one point.

For description and prices see opposite page.
For complete arrangement of apparatus see page 48.



Cross section of three quarter span patent iron frame commercial rosehouse on iron post foundation, showing 2 lines of **Lord & Burnham Co.'s Patent Improved Ventilating Apparatus for Florists**, also wood framed plant beds.

For description and prices of the ventilating apparatus see page 46.

INFORMATION REQUIRED.

When ordering or writing for estimates for ventilating apparatus for greenhouses, kindly give the following particulars :—

Number, lengths and location of shafts required.

Number and size of the sash in each line. State whether continuous or with space between.

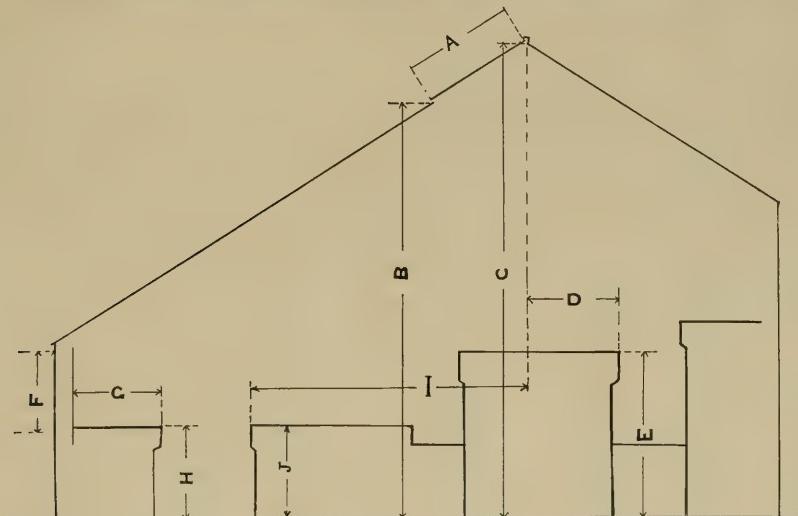
In a framed house, number and size of rafters and distance center to center.

In a sash bar house; size of bars and spacing.

Send cross section of each house, marking in same all the measurements indicated by the letters on the sample section given below.

Locate the sash to be opened on the sections, and state whether they are hinged at ridge or purlin.

State which style of apparatus is preferred : whether the **patent standard style** shown on pages 43 to 45, or the **improved style with pipe post and mitre gears** shown on pages 46 to 48.



- A Width of top vent.
- B Height from floor line to bottom of vent at purlin.
- C " " " " ridge.
- D Distance from centre of ridge to edge of bed.
- E Height of bed from floor line.
- F Width of front sash.
- G " " bed.
- H Height " "
- I Distance from centre of ridge to edge of bed.
- J Height of bed from floor line.

LORD & BURNHAM CO.'S IRON COLUMNS FOR GREENHOUSE ROOFS.



We call particular attention to the construction of our "Iron Columns" for the support of greenhouse roofs. The column is cut from the best steel tubing and straightened. The top fitting is fastened with screws to the under side of purlin or ridge, and receives the top of the column.

The bottom adjustable fitting is placed on concrete, brick pier or post at grade line, and receives the bottom end of the column.

The wide bell shaped foot piece braces the column, increasing its carrying capacity.

The foot piece has 3 inches of adjustment, making a convenient allowance for inaccurate measurements, difference in the heights of the foundation, and for any future settlement.

The set screw holds the column firmly when adjusted, and does not weaken the column or rust up solid as it will when the adjustment is made by cutting a long thread directly on the tubing.

LORD & BURNHAM CO.'S IRON COLUMNS FOR GREENHOUSE ROOFS.



This figure shows the regular top piece fitting into column. A screwed fitting will be furnished when ordered.



This represents a fitting adapted for the top of columns, to support angle iron purlins. Cost, extra per column, 10c.



This fitting is adapted for use on the top of a column coming under a rafter. It can be set to any angle desired. Cost, extra per column, 10c.

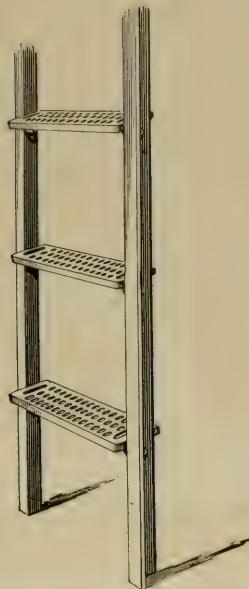
PRICE LIST OF IRON COLUMNS, INCLUDING REGULAR TOP AND FOOT PIECE.

No. 1	No. 2		No. 3		No. 4		
7 foot Column \$0.70	10 foot Column \$1.03		13 foot Column \$1.57		15 foot Column \$2.40		
8 " " .75	11 " " 1.09		14 " " 1.65		16 " " 2.50		
9 " " .80	12 " " 1.15		15 " " 1.73		17 " " 2.60		
10 " " .85	13 " " 1.21		16 " " 1.81		18 " " 2.70		
Separate fittings:		Separate fittings:		Separate fittings:		Separate fittings:	
Top piece .07	Top piece .08	Top piece .09	Top piece .10	Foot " .18	Foot " .26	Foot " .30	
Foot " .18	Foot " .22	Foot " .26	Foot " .30	Per set .25	Per set .35	Per set .40	

Longer or shorter columns pro rata with above prices.

The sizes of tubing given in above list for the lengths are as heavy as ordinary uses require.

For illustrations and description see opposite page.

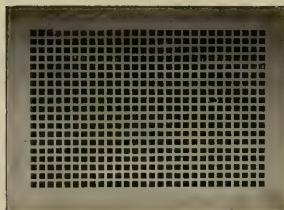


LORD & BURNHAM CO.'S IRON STEP LADERS FOR FIRE ROOMS.

These ladders are 20 inches wide and made any desired length. The tread is adjustable to any angle to which the ladder may be set. The sides are angle iron, the treads cast iron.

Price, per lineal foot of ladder, \$1.25.

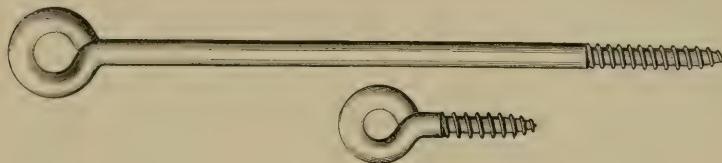
LORD & BURNHAM CO.'S WALK GRATINGS.



These can be furnished in any length or width desired, and are designed for walks over heating pipes in trenches. They are neat in design, extra heavy and strong. Other patterns can be supplied, and any pattern desired will be made to order.

Price, 75 cents per square foot.

LORD & BURNHAM CO.'S GALVANIZED SCREW EYES.



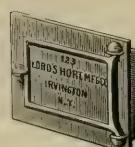
SIZES AND PRICE LIST.

Length.	Per Gross.	Per dozen.	Length.	Per Gross.	Per dozen.
1½ inches.	\$1.50	.16	8 inches.	\$6.25	.55
2 " "	1.90	.18	10 "	8.00	.70
2½ " "	2.00	.20	12 "	10.25	.90
3 " "	2.25	.20	15 "	11.75	1.00
4 " "	3.40	.30	18 "	16.00	1.50
6 " "	4.50	.40	24 "	28.00	2.50

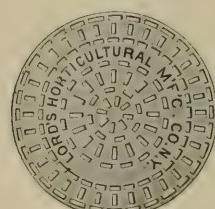
Galvanized Wire No. 13 @ 8c. per pound.
Estimates for wiring vineeries furnished upon application.



Manhole Door and Frame.
14½ x 11½ in.
Price \$2.50



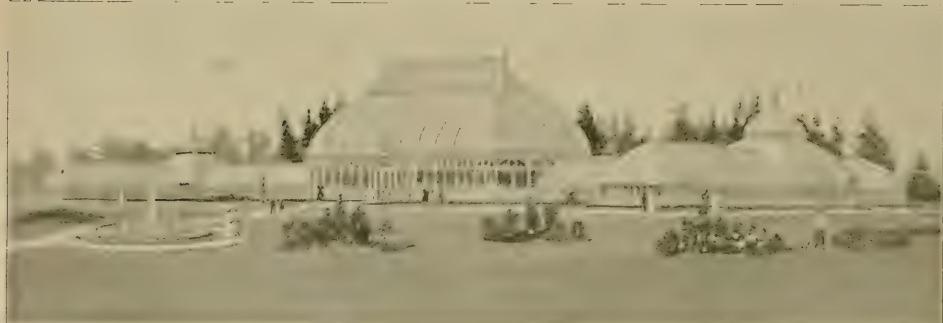
Cleaning Door and Frame
for Chimney. 6 x 8 in.
Price \$0.75



Vault Cover.
18 in. diameter.
Price \$1.25

SPECIAL NOTICE.

Designs and Estimates furnished for Greenhouses, Rosehouses, Conservatories and all kinds of Horticultural Buildings, which we erect in any part of the country, complete, ready for use, or we will furnish plans and material for their construction only. Largest builders of Greenhouse Structures. Plans and Construction embrace the latest improvements. Unequaled facilities for manufacturing. Catalogue sent upon application.



View of Conservatory in Schenley Park, Pittsburgh, Pa.

DESIGNED AND ERECTED BY
LORD & BURNHAM CO.



The Lord Horticultural Mfg. Co.

Irvington-on-Hudson, N. Y.

Gentlemen: -

In response to your inquiry as to how I am satisfied with the steam heating apparatus put in by you in my greenhouses on Jersey City Heights, I have pleasure in stating that after a three years' trial, I am entirely satisfied with its results. On a large scale such as ours, it is a great saving in fuel, probably 20 per cent., and the admirable arrangement for shaking and dumping the grates not only makes the labor of "stoking" such as anybody can do, but also by the saving of time, it materially lessens the labor.

Yours very truly,

Pete. Henderson

Chatham July 16th 1897
Lord & Burnham Co -

Dear Sirs

Enclosed please
find as requested
We are very sorry for the
delay - that same was not
the cause of any unwillingness
on our part to comply -
but to make Comparties.
In order that we might
know where we were at
and that our testimony
might be honest & in every
respect - and will enable
us to back up our statement
Wishing you every success
we remain truly yours
A. P. & S. Burnham

1897
Chatham N.J. July 16th
Lord & Burnham Co -

Dear Sirs

In reply to
Your Enquiry - as to how
we like our new section
al Boilers. we will say
that we can confidently
recommend them. as good
quick heaters, economical
in fuel and labor -
saving in the care of
them -
In regard to new venti-
lating apparatus. would
say - if it is perfectly
satisfactory
Very Truly Yours
A. P. & S. Burnham

I. M. NOE.
FLORIST,
P. O. Box 29,

Madison, N. J., June 15 1897

Messrs Lord Burnham & Co.

Gentlemen:

I have used your sectional
hot-water boiler this winter,
with satisfactory results.

My boiler is the first one
made by your Co. has ten
sections and heats easily four
hundred (400) running ft.

Yours Respect.

I. M. NOE.

July 21'91

HOMewood
MADISON, NEW JERSEY.

Mrs. Lord & Burnham Co
Tiverton-on-Hudson
New York

Dear Sirs:

It gives me much pleasure to express to you my entire satisfaction with your improved Sectional Hot Water Boiler placed last year. In economy of fuel, evenness of heat generation & flow, easiness of regulation & care I consider it the very best -

Yours very truly
Hannibal Tilden

A letter from Mr. Joseph Pulitzer's gardener at Bar Harbor, Me.

Petersfield, Bar Harbor, Me. Oct 2^d 1897

Mrs. Ladd & Burnham Co.
Dear Sirs.

As I promised to let you
know how our Lat water Heating -
Operating behaved during the last
winter, I can truly say that it gave
me great pleasure to inform you
that I did not have the least trouble
in keeping up the desired temperature
55° during nights when the thermometer
varied 15° below zero. Here
in Bar Harbor the Climate is no
severe during the winter months
the thermometer seldom goes down as low
as 20° below zero. I never attempted
to stay up any later than 9 o'clock in
the Evening when I turned the heat
for the night and at 6 o'clock

in the morning the temperature had
not varied more than 5° and that
blasts well 20° or 25°. The automatic
air-trace, I think, is perfection
as it distributes the heat very evenly
through the house. As to consumption
of fuel, I am certain that you that
water apparatus does not take is much
fuel for the amount of heat, as other
Lat water Heaters that I have been using
during my 25 years practice in
the United States. I had now been
using your hot-water apparatus for the
past 8 years and I prefer your
Heaters to all others that I have
been using. The pump action is perfect
it cannot possibly be any improvement
made on them; I was fearful that the
severe cold we have here would affect
them, but not in the least, they were as
free from ice as could be.

Yours truly J. H. Estman

T. W LYDECKER,
...Florist...

CHRYANTHEMUMS, ROSES, CARNATIONS, PALMS AND
ALL KIND OF DECORATING PLANTS.
GRAND AVENUE, NEAR LINDEN
Telephone 641-5

Englewood, N.J. June 17. 1897

Lord & Burnham Co

Gentlemen

Your new heating water that was set for us last winter has given the greater satisfaction. It heats two large rose houses ~~at~~ five & fifty eight degrees at night, besides during the day on twenty five thousand feet of glass.

As far as economy of fuel it will compare with any heater on the market.

This water was given the most severe test last winter after burning ~~five~~ full heat without cooling. This is a big item to favor

This water I will recommend to all florist as the easiest to fill, clean, run and the most powerful heater in the market.

All your other ~~other~~ heaters and the five in one house you constructed for us have given satisfaction

Yours truly
T. W. Lydecker & Co

Sturbridge Farm.
Brookline, Mass.
June 14/97

Lord & Burnham Co
Gentlemen

In reply to your inquiry as to efficiency of the three heaters just in Hon. C. F. Spragues Greenhouses in 1896. would say that they have proved to be very satisfactory in all respects.

They are very economic of fuel as well as being easily managed.

Your Patent roller grate is a decided improvement over the old ones.

I consider that your heaters are much better in respects than any I have ever used and should be pleased to recommend them to any one making inquiries of you.

I remain.

Very truly yours.
Israel Weir

Gardener for Congressman C. F. Sprague.

DAILLEDOUZE BROTHERS,

Carnation and
Chrysanthemum
Specialists.

...Florists...

Flatbush, Brooklyn. N.Y., July 1st 1897

Lord & Burnham here

We have had in now this past four
years your No H. Balloons we find soon
to say they are first class and very respect
and have given us entire satisfaction

Dailledouze Bros

John Henderson Co.

P. O. Box 156,

Flushing, L. I., Dec 2nd 1889

Lord & Amiciat - W. J. - co

Gentlemen.

I have used your Boiler
for the past two years. and from
actual test along side other Boilers I
have found them the best. there -
strong points. are ease of management
economy - In Fuel. & Labor -
Heating capacity. Strength and
durability. I have in use. 7. of
your largest - Sized Boiler -
which are. and have given me
entire Satisfaction - you may -
Refer anyone to me. And I
shall be pleased to show them
all that I can - John Henderson co

Yours truly - John Henderson co
Chas. P. Anderson manager

Newport, R.I.

Mess^{ts} Lord & Burnham Co
Cants

Just a line to say that the
3 large boilers that you sent me
to heat the large range of fruit
plants & Rose House's, have done
their work admirably during last
winter. Fully confirming in my
mind, the opinion formed through
previous experience, that they
are the most economic, easiest
handled boiler, that I have yet
seen. Every particle of fuel is
utilized fully, the spacious door
way making it easy to feed.
The shaking grate is perfection
itself. It is a comfort to know
that when the thermometer is
below zero, and a high wind
blowing that you can stoke
up at 7 A.M. go home
and find every thing O.K.
in the morning at 7 A.M.
Clean fires, the damper properly
regulated, and zero weather
combatte in vain against
Lord & Burnham's boiler for
12 hours & having attention.

I remain

Very truly yours
John T. Johnson

S. to Ogden Gallett Esq

Jamaica Plain June 16, 91

Dear Sir

It gives me great
pleasure to testify not
only to heating apparatus
but to work of the whole
greenhouse everything
done so neat and well
The boiler worked well
had no trouble in keep-
ing the desired heat
and did not burn
a great deal of coal

Very Truly Yours

John T. Leonberg
19 Boylston St
Jamaica Plain
Boston Mass

Gardener for Mrs. R. T. Reed.

DAVID CLARKE'S SONS,
Florists
Boulevard 78th & 79th Streets

New York June 22nd 1897

Lord & Burnham Co

Gentlemen —

We wish to express our entire satisfaction with the two Palm houses you have erected for us and especially the heating apparatus which we had an opportunity of testing this past winter.

Your new Boilers are certainly the most economical we have ever used and take great pleasure in recommending them.

Yours truly
David Clarke's Sons

Oakdale Long Island

January 28th /90

Lord Horticultural Mfg. Co.

Irvington on Hudson N.Y.

Gents.

It is with pleasure that I certify to the merits
of your Boiler over any other Boiler that I have used, and
I may say that in the last 20 years I have had under my
charge "in use" several of the leading Greenhouse-heating Boilers
of this Country. Your Patent Shaker & Grate, work admirably,
and I cheerfully congratulate you on your ability in putting
before the Public a Boiler that is economical in Fuel, and
easy to Clean & Stoke, besides the fire-heat is almost entirely
spent on the Boiler before entering Chimney. We have now
working 2 of your No. 5 Boilers & I would be pleased to have
anyone call & see how perfect they work.

Yours truly,

A. McDonnell, Supl.

for W. Bayard Butting Esq.

Wet Brook Farm Esq.

Lord Horticultural Mfg. Co.

232 Clinton Ave
Brooklyn
Dec 10th 1889
Mssrs Lord & Burnham
Dear Sir

You ask my opinion of your Boiler I think it is the leading Greenhouse Boiler today
I have used the three different Boiler that are used around here. I have used your old Boiler for seven year & count it equal to any Boiler of it size
The Improved which we have only one. (is a regular gem) or ~~rather~~ beyond any expression of praise I can give it

Respectfully yours
David Rose
Gardener to Chas Pratt Esq
232 Clinton Ave
Brooklyn

U. S. Botanic Garden.

Washington D. C. Aug. 3rd, 1890

Lords Horticultural Mfg. Co.

Dorington-on-Hudson

N.Y.

Gutternun:

For twelve years we have used your
hot water boiler for extra hot house purposes
and are now using your steam boiler for
green house purposes, both giving perfect
satisfaction. The Greenhouses you built
for us are a great source of satisfaction being
both excellently adapted for cultural purposes
as well as being architecturally neat and
appropriate.

Very truly yours,
W^m. R. Smith
Asst. Botanic Garden

THE SUNNYSIDE NURSERY.

THORWALD JENSEN,

FLORIST

Mamaroneck, N.Y., Dec^o 9th 1889.

Lords Horticultural Mfg Co.

Gentlemen

In accordance with your request regarding your boilers, I will say, that I find them to be powerful, economical and quick-heating.

The three new boilers (together with the old fashioned one which you put in for me 16 years ago) heat over 14000 feet of large houses, (ground measurement) of which two are used for roses.

The old boiler is apparently still in good condition although it has since been moved and removed.

I consider your new grates far superior to the old style, so that your boilers as you make them now can hardly be improved upon. I should never put in any other heating apparatus but yours

yours very truly
Thorwald Jensen.

JOHN REID,
ROSE AND BULB GROWER,

Bergen Ave., near Bidwell Ave.,

JERSEY CITY, N. J., Dec 2nd 1889

Lords Horticultural Buff & Co
Gentlemen

It gives me great pleasure
to be able to say a good word for your
Heating apparatus - I have eight of your
Boilers in use on my place and they
from entire satisfaction - They are very quick
to start and I think will heat more feet
of pipe with the same amount of fire space
than any other Boiler that I know of. The
fire shaker on the last Boiler you sent in
for me is a wonderfull improvement and
a great save of labor.

Yours truly

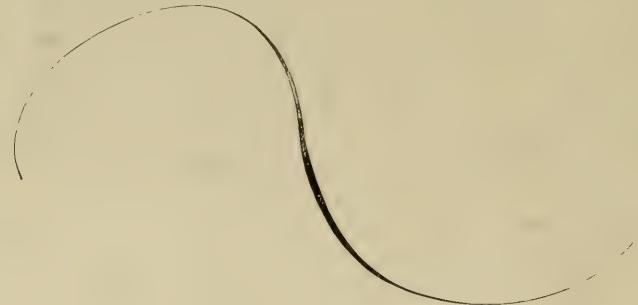
John Reid

KISSENA NURSERIES.

Flushing, N.Y. Dec 11, 1889.

Lord's Horticultural Co
Gentlemen.

We have used
three of your boilers for three
successive years and prefer
them to any we have used
for the last twenty five years



Yours Truly,

Parsons & Sons Co.,

LIMITED



Albany, N.Y. Dec. 10th, 1889.

Lords Mfg. Co.,

Irvington, N. Y.

Gentlemen,- After thorough investigation, I gave the preference to your greenhouse heaters, and now have two of your largest size in use, giving perfect satisfaction. Recently, I have been investigating dwelling-house heaters, and I have been unable to satisfy myself that any of them will do the work better, if as well, as one of your greenhouse heaters, and am inclined to try one when I make a change.

Yours,

P. K. Dederick.



F.R. Pieron Co.
Tarrytown-on-Hudson,

New York, July 18th 1893.

Messrs. Lord & Burnham Co.,
Irvington-on-Hudson, N. Y.

Gentlemen:-

I wish you would place for us two additional boilers, one in each boiler room, heating our new range of rose houses at Scarborough. While the boilers already placed are amply sufficient for the work required we wish to use these boilers for reserve to provide against any possibility of accident, which we look upon as so much insurance.

We have used your boilers now for some eight years for both steam and hot water and they have given us perfect satisfaction during that time, and we consider them by far the best boiler made to-day for greenhouse heating purposes, as the boilers are very durable and also economical in coal consumption. The direct fire surface--and this is the important factor--is very large and the return flues through which the fire reverberates after passing through the tubes directly over the fire surface, gives an additional amount of surface of great heating power, and these surfaces are all very easily cleaned, which is a particularly valuable feature. We consider your boiler uses considerably less fuel than another boiler of like heating power, owing to the perfect combustion obtained by reason of its scientific construction.

I do not know as I have told you how pleased we are with the operation of your rocking grates. We have had these in use now during the eight years the boilers have been used and they have not cost us a single dollar for repairs during that length of time. In operation they simply work to perfection and are an immense labor saving device, the mechanical action being so regular and perfect that they remove every piece of clinker and ashes from the fire, acting as a sifter without any waste of coal whatever, so that we never have to stoke or stir the fire with bar or poker. the grates cleaning the fire thoroughly, which will be appreciated by anyone who has had to fire a boiler in the old fashioned way.

If you would push your boilers more, and advertise them, and let the florists of the country know its merits, instead of letting it work itself into position by reason of its superiority, few, if any other boilers would be used for greenhouse heating.

Very truly yours,

REFERENCES.

The names and addresses of some of the parties for whom we have designed and erected Greenhouses and furnished Heating and Ventilating Apparatus.

Alabama.

Alabama Polytechnic Institute,

Auburn.

California.

University of California,

Berkeley.

Geo. C. Pape,

"

L. L. Robinson,

Cornwall.

D. O. Mills,

San Francisco.

Golden Gate Park,

"

Colorado.

J. B. Wheeler,

Manitou.

Connecticut.

A. N. Pierson,

Cromwell.

H. M. Bradley,

Derby.

D. N. Barney,

Farmington.

Rev. Washington Choate,

Greenwich.

E. C. Converse,

"

A. A. Young,

Jewett City.

Conn. Hospital for Insane,

Middletown.

B. B. Tuttle,

Naugatuck.

Mrs. J. H. Whittemore,

"

A. J. Sloper,

New Britain.

E. Henry Barnes,

New Haven.

Frank S. Platt,

"

N. W. Hubinger,

"

Conn. Agricultural Exp. Station,

"

Miss M. Eldridge,

Norfolk.

E. N. Gibbs,

Norwich.

W. A. Slater,

"

Mrs. J. W. Clark,

Pomfret.

Chas. R. Christy,

Stamford.

Ferdinand Ward,

"

Chas. Stewart Smith,

"

John T. Williams,

"

S. M. Buckingham,

Waterbury.

Mrs. J. C. Welton,

"

A. McGlashan,

"

Memorial Chapel Conservatory,

"

J. S. Elton,

"

W. J. Snow & Co.,

"

Chas. Miller,

"

District of Columbia.

Executive Mansion,

Washington.

U. S. Botanic Garden,

"

U. S. Dept. of Agriculture,

"

A. Nailor, Jr.,

"

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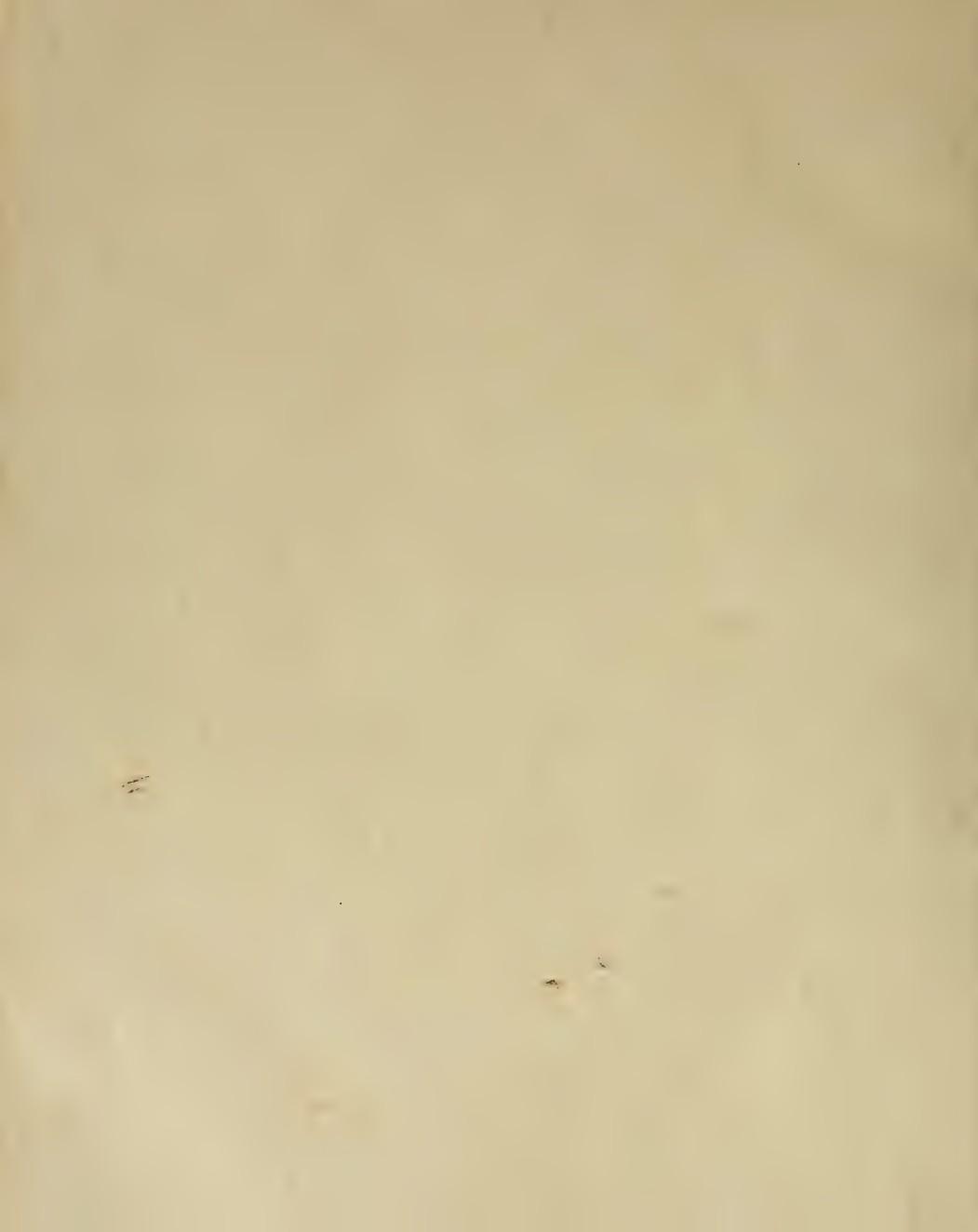
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